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The Complete Outdoor Photography Manual

You might be forgiven for thinking that outdoor photography is another name for landscape photography but there is so much more to it than that. As the name suggests, landscape photography is the capture of the environment around us, whether coastal, rural or even urban. Some photographers will go as far as to make sure there is no man-made presence in any of their work. Well, we want to show you that there is more to being outdoors with your camera than shooting pure landscape images.

Think of this manual as a guide to some of the kinds of photography that is possible outside the four walls of your own home. Potentially, there is so much to do and capture when you venture outside with the desire to create some fun and interesting images. Before you let yourself loose on the world armed with your camera, we have compiled an essential list of outdoor photography hints and tips, as well as a general guide to choosing cameras and lenses and other useful gear.

We also walk you through some aspects of photography that can help you understand what photography is all about and improve your skills. Then, when you are ready, we have a series of ideas and projects that involve outdoor photography, that vary from abstract landscapes to infrared photography. Unleash your creativity and get the most out of your camera and photographic equipment.

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CHOOSE YOUR CAMERA

Some essentials to start shooting outdoors

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In this first section, we want to outline some of the essentials you'll need to consider if you are looking to purchase your first camera, or upgrade what you currently have. Shooting outdoors, particularly if you are wanting to shoot landscapes, can be done with the cheapest of compact cameras, all shot hand held. That is absolutely fine up to a point. Beyond that, to take your outdoors photography up a notch, getting informed about lens types and investing in a good tripod, are key things to bear in mind.

Over the next few pages we'll look at a few of the many different types of camera that are available. We show you a few good tripod choices, lens types, and also look at some of the accessories that are available to help you take better photos when you venture out into the world. ■

Choosing the right camera

Which one is right for you to take outdoors on your next adventure?

Cameras come in so many shapes and sizes, packed with gadgets and technology that can be confusing to the average enthusiast. Add to that the fact that there are many types of camera system too, and you would be forgiven for wondering if it's easier to take up fishing instead. Don't worry, if you just want to snap pictures of your friends on holiday or shoot with the latest medium format camera in the wilds of Borneo, we've got a list of camera types that help sort it out for you.

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1. Standard compact

Most compact cameras fall into this category. They tend to be fairly small and light, measuring about 100 x 50 x 25mm and weighing around 120-130g. Modern standard compacts are normally fully automatic, although some may offer basic manual exposure options. They usually have a zoom lens of up to 10x which folds flush with the camera body and an LCD monitor of about 7cm diagonal size. Prices start at about £60 for budget models, up to around £300 for luxury models. Extra features may include such things as HD video recording, image stabilisation or Wi-Fi connectivity, and they often come in a range of colours.

2. Zoom compact

Zoom compacts, also sometimes known as Travel Cameras, are broadly similar to standard compacts, but are equipped with more powerful lenses, some as large as 30x zoom. Most have robust metal bodies, high-capacity batteries and large monitor screens; many also feature HD video recording and optical image stabilisation. They are usually larger than standard compacts, with bodies that incorporate a small handgrip for more comfortable handling, and the lenses do not usually fold completely flush with the body. Many models now also have optional manual exposure features, and some include built-in GPS for automatic geotagging of your travel pictures. Prices start at around £150, going up to around £700 for luxury models.

3. Adventure cameras

A category that has been growing in popularity, Adventure Cameras are designed to be used outdoors in extreme conditions. They are waterproof, many are also shockproof, and a growing number are also advertised as being "freezeproof", although that seems to be taking things to the absolute extreme. In terms of capabilities most adventure cameras are similar to standard compacts, with up to 5x zoom lenses that are usually non-protruding and protected behind toughened glass ports. From rock climbing to surfing, this is the kind of camera that can keep up with an active outdoor lifestyle.

4. Advanced compact

Advanced compacts are designed for more experienced photographers, and offer superior photographic versatility and quality, as well as advanced creative features such as manual exposure controls, manual focusing, optical viewfinders and external flash connections. They are considerably more expensive than other types of compact, with prices ranging from around £300 to over £500. There is an even more rarefied category that has appeared more recently of advanced compacts with larger sensors. The use of a larger sensor offers better image quality and great low light performance , as well as an expanded set of features. Prices vary quite a bit within this range of cameras, starting from around £500 to well over £3000.

5. Super-zoom

Super-zoom cameras used to be called "bridge cameras", since they were seen as half-way between compact cameras and DSLRs, but they have been falling out of favour over the past few years as zoom compacts and CSCs encroach ever further into their traditional territory. Nonetheless there are still a number of super-zooms on the market, and most of them are very capable cameras. They are usually quite large, with SLR-style bodies including big hand grips and electronic viewfinders. All offer powerful zoom lenses, some as much as 50x zoom, and usually include optical image stabilisation. Most also feature advanced HD video recording, often with stereo audio, and some also include advanced photographic features such as manual exposure and flash hot-shoes. Prices start at around £170, going up to nearly £400 for the more advanced models.

6. Compact system cameras

Compact system cameras (CSC), also known as mirrorless interchangeable lens cameras (MILC), have interchangeable lenses, allowing photographers to choose a particular lens for a particular task, and also have a range of other accessories such as flashguns. They offer most of the versatility and image quality of digital SLRs, but in a smaller, lighter and in most cases less expensive package. They are a good choice for the hobby photographer who wants to extend their range, but who doesn't want to be dragging a heavy bag of full-sized lenses around. There is a wide variation in quality and capability and prices range from less than £300 to over £1,200. As sensor technology improves, the compact system camera offers a viable alternative to outdoor photographers who need to travel light but need quality images.

7. Smartphone cameras

There is no getting away from it, the smartphone has turned the idea of a point-and-shoot camera on its head. Smartphone imaging technology has come a long way and your average smartphone is now capable of shooting 16 megapixels with impressive low-light capability for such a compact device. Moreover, m any smartphones now have the main camera backed up with a front-facing, lower resolution, 'selfie' cam as well. Most new smartphone cameras have the ability to be able to take very wide panoramas by merging images taken as you pan the camera to create some detailed landscape images.

8. Digital SLR

Digital SLRs (DSLR) have interchangeable lenses, and most digital SLRs can use the same lenses as their older film-based predecessors. With specialist lenses available for particular tasks. SLR systems are the choice of most serious amateur and professional photographers, offering superb image quality. Most DSLRs use a sensor size called "APS-C" but a few top-end cameras use larger "full-frame" sensors the size of a 35mm film frame. A good full frame DSLR with a couple of great lenses is still the main choice for capturing great outdoor images in a range of conditions and lighting challenges. From a misty morning to a starry night, the DSLR can shoot it all.

9. Medium Format

If even a full-frame DSLR isn't quite good enough for you, you could always try a digital Medium Format camera, which has an even larger sensor. The new Hasselblad X1D-50c has a 50 megapixel sensor and amazing picture quality, but it doesn't come cheap. With a standard lens it will cost you around £15,000!

Your next camera?

Some interesting cameras to consider

If you are just a holiday shooter or an enthusiast landscape photographer, then your choice of camera can be fairly specific. Obviously, when looking at a new camera, budget will have a major part to play. It is always recommended that you try to get the best camera you can afford without breaking the bank. Just be aware that it is a good idea to get something that you can grow into as you develop as a photographer. You may find that if you get a basic model with limited manual controls, you will quickly outgrow it and go looking for a new camera anyway, so it is something to keep in mind.

You may not need all the fancy technology and gadgets that are on offer with certain cameras when you start out, but that may soon change as you crave more exciting ways of taking photos. So with all that in mind, here is a selection of some varied and interesting cameras from both ends of the scale; hopefully, it may pique your interest and point you in the right direction. ■

Canon EOS R

Mirrorless full-frame
£2350/$2230/€2585

- 50-102400 ISO
- 30.3 megapixel full-frame sensor
- 8fps max shooting speed

Nikon Z 7

Mirrorless full-frame - £3462/$3500/€3699

- 493 PDAF focus points
- 45.7MP sensor
- 4K UHD movies

Panasonic Lumix LX100

Micro Four Thirds camera - £500/$580/€590

- 12.8 megapixel MOS sensor
- 4K movies
- Classic manual control

Fuji X-T2

Mirrorless APS-C camera
£1399/$1599/€1649

- 24.3 megapixel CMOS sensor
- 3.0 inch tilt-angle display
- 8 fps shooting speed

Panasonic Lumix TZ70

Travel camera - £280/$400/€322

- 12 megapixel sensor
- 24-720mm f/3.3-6.4 lens
- 30x zoom range

Pentax K-1

Full-frame DSLR - £1799/$1946/€2073

- 36 megapixel CMOS sensor
- 33 Autofocus Points
- ISO 100-204,800

Choose the right lens

Make sure your next lens is right for the job

A camera can stand or fall depending on how a good a lens you have attached to it, and also if it is right for the job in hand. Imagine setting up by a beautiful lake that stretches off as far as the eye can see in each direction. You would need a wide angle lens with a very short focal length that is capable of capturing all that grandeur and spectacle, but all you have is a telephoto lens. That is going to limit the kind of shot you could take there. You could also find yourself in a field of bluebells, wanting to get an extreme close-up of the dew on those gorgeous flowers. All you have in your bag is a standard lens with a minimum focusing distance that puts that dew-covered bluebell so small in the frame, it just doesn't work as a photo. After choosing the right camera, lens choices are your next port of call.

Lenses can be divided into two main categories: zoom lenses, which have a variable focal length; and prime lenses, which have a fixed focal length. Zoom lenses have the advantage that they are more versatile, so just a couple of lenses can cover a wide range of focal lengths, but they also have several disadvantages. They are heavier than prime lenses, the optical quality is usually not quite as good, and they usually have a smaller (slower) maximum aperture. Prime lenses, conversely, are lighter and usually of better optical quality, but you have to carry more of them to cover a range of focal lengths. Both types of lenses are available in a huge range of sizes and prices, from cheap standard 50mm lenses to ultra-fast telephoto zooms costing over £10,000.

There is actually relatively little difference in price-per-focal length between zooms and primes; both vary widely depending on quality, focal length and maximum aperture, with both popular and premium varieties of both types.

Some photographers prefer the convenience of zoom lenses, others prefer the superior performance of prime lenses, while others prefer to use a mixture of prime and zoom lenses depending on the circumstances.

For creative photography and amazing landscape and outdoor images, you'll need to get lenses that are suited to the task.

TYPES OF LENSES

Pancake lens

Typical focal length:
Wide, Normal, Telephoto

Simply put, a pancake lens is a very flat prime lens. It is shorter than it is wide and it is very small and light. They are used primarily by photographers who are after a small and compact camera/lens system. They are used with DSLR and Micro Four Thirds cameras. Relative to their diminutive size, they can produce very good images.

Standard zoom

Typical focal length:
28-80mm (full-frame equivalent)

This is the most common focal length, suitable for general photography and useful for everything from landscapes to portraits. Most systems will include a couple of lenses in this focal length range, usually a cheaper, slower version often included as a kit lens with a new camera, and a premium quality lens often costing a lot more.

Ultra-wide zoom

Typical focal length:
16-35mm (full-frame equivalent)

Ultra-wide-zoom lenses are primarily used for landscape photography. They are more specialised than standard zooms, and consequently are usually more expensive, although some systems include both standard and premium types.

Macro lens

Typical focal length:
50-100mm (full-frame equivalent)

A true macro lens by definition should be able to record an image at 1:1 scale on the sensor or medium it was shot on at its closest focusing distance. This magnification factor means that a macro lens is able to fill the frame and reveal amazing detail on very small objects.

Medium telephoto zoom

Typical focal length:
80-300mm (full-frame equivalent)

The medium telephoto zoom is useful for amateur wildlife or sports photography, or portraits at the shorter end of its focal length range. Telephoto zooms have a smaller effective aperture than standard zooms.

Specialist lenses

Typical focal length:
400-1200mm (full-frame equivalent)

Specialist lenses are used mainly by professionals and advanced enthusiasts. These include both zoom and prime ultra-fast telephoto lenses used by sports and wildlife photographers.

CONVERSION FACTORS

Since most digital SLR and CSC cameras use sensors that are considerably smaller than a frame of 35mm film, when using lenses designed for older film cameras the field of view is reduced by a certain amount. This has the effect of increasing the apparent focal length, so what had previously been a wide-angle lens now becomes closer to a standard view lens.

This "crop factor" or "conversion factor" is an important consideration when buying a lens. To convert the focal length of a digital SLR lens to the equivalent focal length of a lens for a 35mm camera, it must be multiplied by the conversion factor.

For APS-C cameras this is approximately 1.5:1, so a standard 18-55mm zoom lens, as supplied with many DSLRs, is roughly equivalent to 27-82mm, close to the 28-80mm that is a standard zoom on 35mm cameras. If one were to use that 28-80mm lens on a DSLR it would be the equivalent of a 42-120mm zoom.

Olympus and Panasonic Four-Thirds systems have a conversion factor of approximately 2:1, so a standard zoom for these systems is usually 14-42mm, which again is roughly equivalent to the 28-80mm full-frame standard.

Tripod tips

The best way to avoid camera shake spoiling your shots

The Xshot mini travel tripod, when folded away, is small enough to fit in your pocket. It could not really support a large DSLR, but your cameraphone or compact camera would be fine.

There can be no worse feeling, for a photographer of any skill level, than finding yourself in a location where the combination of setting sun, clouds, land and water conspires to create the perfect landscape image and what you actually capture is blurry due to too slow a shutter speed and the fact you shot it hand held. In situations like this, the tripod becomes your saviour. All the best cameras and lenses in the world cannot save you from the need to shoot long exposures in low light conditions. Even the most modern DSLRs with very high ISO capability will still produce a noisy image if you bump the sensitivity too high. If you want the sharpest, highest quality images for shooting in low light situations outdoors, then you will need a tripod.

Rigidity and carrying weight are going to be the key factors when picking the best tripod for your needs. The tripod you choose has to be able to support the weight of your camera and hold it perfectly still. Any movement or flexing of the tripod, will ruin that perfect landscape shot you spent hours hiking up hill and down dale to find. Some cheaper tripods with plastic heads and thin aluminium legs are too 'bouncy' to be used with anything heavier than a compact or light superzoom. Set the tripod up and press down on the top of it. If it flexes by more than a few millimetres it's not going to be stiff enough to support the weight of a heavy camera. ■

> "Rigidity and carrying weight are going to be the key factors when picking the best tripod for your needs."

MONOPODS

If carrying a tripod around is inconvenient, a good alternative is a monopod, essentially a single telescopic support leg with a camera mounting on the top. Obviously they don't provide the stand-alone support of a tripod, but they can be a big help in reducing camera shake. They are also handy for shooting in confined positions where a tripod won't fit, such as in a crowd.

TYPES OF TRIPOD

POCKET TRIPODS

These are miniature tripods designed for small compact cameras, and are ideal for table-top use, or for positioning your camera for a self-timer group shot. They're small enough to slip into a jacket pocket or into your camera pouch. There are several different types, including ones with telescopic legs, ball or pan-tilt heads, and even flexible legs. One unique and extremely versatile design is the Joby Gorillapod, which can grip onto almost any object or work as a tripod.

BUDGET TRIPODS

There are many cheap tripods on the market, many costing less than £20. There are some very good ones, such as this Hama Star 75, but many lack the rigidity to support heavier cameras and lenses.

TRAVEL TRIPODS

Travel tripods are designed for general use where low weight and portability is an important factor. They are made of lightweight materials, usually aluminium or carbon fibre, and are suitable for most types of camera from compacts up to mid-range DSLRs, although not with large telephoto lenses.

PROFESSIONAL-GRADE TRIPODS

Top quality tripods are made from high-tech materials like carbon or basalt fibre, with magnesium alloy fittings and superior workmanship. They offer the best rigidity and support for even the heaviest cameras and lenses, but they are very expensive. The Gitzo Mountaineer Series 1 seen here costs over £800.

Digital storage

Your precious holiday photos in safe hands

As camera technology develops and the megapixel count increases with every new camera that is released, the file sizes that these cameras create when shooting in Raw format can be substantial. As an example, if you were to shoot a highly detailed landscape image with lots of tree, grass, clouds and mountains, an uncompressed 12-bit Raw file from something like a Nikon D810 could be as much as 55MB. Now imagine shooting an action scene of ponies running across the moorlands in burst mode and capturing twenty shots in just one sequence, you can imagine how quickly you would start filling up any digital storage. There's more to it than just the amount of storage you have. A memory card of 64GB will let you store a lot of images, but if that card cannot write the data from the camera fast enough, that burst mode sequence of ponies that your camera should be able to shoot at 8 frames per second is going to hit a digital log jam after a couple of shots because the buffer can't get the image data written to the card and it all grinds to a halt while it finishes the task. Clearly, there is more to memory cards than meets the eye.

Premium or Budget?

The popularity of SD cards has led to a large number of budget brands springing up, and many supermarkets and chain stores sell their own-brand cards at often very low prices. However the best advice is to stick to the premium brands such as SanDisk, Lexar, Pretec, PNY or Kingston, or to camera brands such as Fujifilm or Panasonic. Although they may be more expensive their higher standards of quality control mean that premium cards are usually much more reliable. If you've got a high-performance camera it's also worth spending a bit extra for faster data transfer rates to get the best out of it. ■

A

B

IMAGE A: The inside of an SD card.
IMAGE B: A Compact Flash card.
Memory cards are used in all types of portable devices, including cameras. They contain a chip of Flash memory, which can store data for years without degrading.

SPEED RATINGS

Premium cards have higher data transfer speeds, which means they can store and retrieve data more quickly, an important factor when shooting video or a rapid sequence of still images. The speed of the memory card can have an effect on the overall performance of the camera, especially on high-end models. Unfortunately many manufacturers have their own ways of describing the speed of their cards, which can be very confusing for the consumer.

Some use the 'x' rating, comparing the read/write speed to that of a CD-ROM, approximately 150 kilobytes per second (150 KB/s), so a memory card rated at '40x' speed has a transfer rate of 6 megabytes per second (6MB/s).

The more widely accepted speed rating is the Class system, usually denoted by a number inside a letter C. Most budget cards are Class 2, with a minimum read/write speed of 2MB/s. Most mid-range high-capacity cards are Class 6, with a read/write speed of 6MB/s.

The fastest class currently available are Class 10 cards, which have a read/write speed of at least 10MB/s. The newer ultra high speed UHS-I cards are rated at speeds of up to 45MB/s 90MB/s and the UDMA 7 Compact Flash cards can reach 160MB/s. Some cards offer storage capacity up to 256GB in size. All this from a card that is not much bigger than a postage stamp.

MEMORY CARD USAGE

Kingston SDHC 8 GB
Class 4
£5/$4/€6
Best for: compact camera users and holiday shooters.

SanDisk Extreme Pro
UHS-3 SDXC
64GB, 95MB/s
Class 10
£37/$35/€44
Best for: pros shooting Raw files and 4K movies.

Lexar Multi-use 16GB
Class 4
£5/$9/€6
Best for: compact users and amateur DSLR users.

SanDisk Extreme Pro
Compact Flash
64GB, 160MB/s
£75/$85/€90
Best for: high bit rate DSLR and HD video users.

Lexar Premium SDHC
32GB 200X
Class 10
£15/$12/€18
Best for: varied storage intensive DSLRs and devices.

SanDisk Extreme Pro
256GB, 160MB/s.
£275/$300/€330
Best for: extreme image and video performance.

Transcend SDXC Flash
128 GB
Class 10
£35/$44/€42
Best for: serious DSLR and video enthusiasts.

Lexar Professional
512GB, 525MB/s.
£1043/$1200/€1228
Best for: the highest possible performance.

"The speed of the memory card can have an effect on the overall performance of the camera."

SO HOW MANY PICTURES CAN I TAKE?

The total number of pictures that can be stored on a memory card is a difficult thing to quantify for a couple of reasons. Digital cameras usually store images using the JPEG file format, which compresses image data to save storage space. Most cameras have a menu setting for image quality which varies the rate of compression, with high quality images taking up more space. The compressed size of the image can also vary depending on the subject being shot, since more detailed images contain more data. For a typical modern 16-megapixel digital camera the file size can vary between about 4.5MB for a good quality jpeg and 30MB for an uncompressed Raw file, which means an average 8GB card will be enough for approximately 1400 jpegs or 260 Raw files.

NEXT LEVEL PHOTOGRAPHY

Learn how to get the most out of your equipment

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22 The right mode for the right conditions

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30 Changing your view with focal length

34 Understanding how aperture works

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42 Keep an eye on white balance

44 Landscapes and hyperfocal distance

46 The rules of composition

Modern digital cameras are marvels of miniaturised technology, with many automatic functions to help you take good photos in a wide range of different situations. However by learning more about how your camera works and how to use its many features you can expand the scope of your photography and get good results every time, even in difficult conditions. For owners of more advanced cameras there are options such as aperture and shutter speed control, sensitivity and white balance, as well as creative light metering modes and manual focusing, all of which can be used creatively to make your photos really stand out. It's just a case of getting to grips with the basics of photography and your camera gear.

Photography is a rewarding and potentially profitable hobby, and the more you learn about it the more you'll get out of it. In the next section we'll look at common camera features and how to use them. So read on and find out how that expensive gadget you bought actually works! ■

> "Photography is a rewarding and potentially profitable hobby, and the more you learn about it the more you'll get out of it."

How image compression works

How you can squeeze that big panorama into such a small file

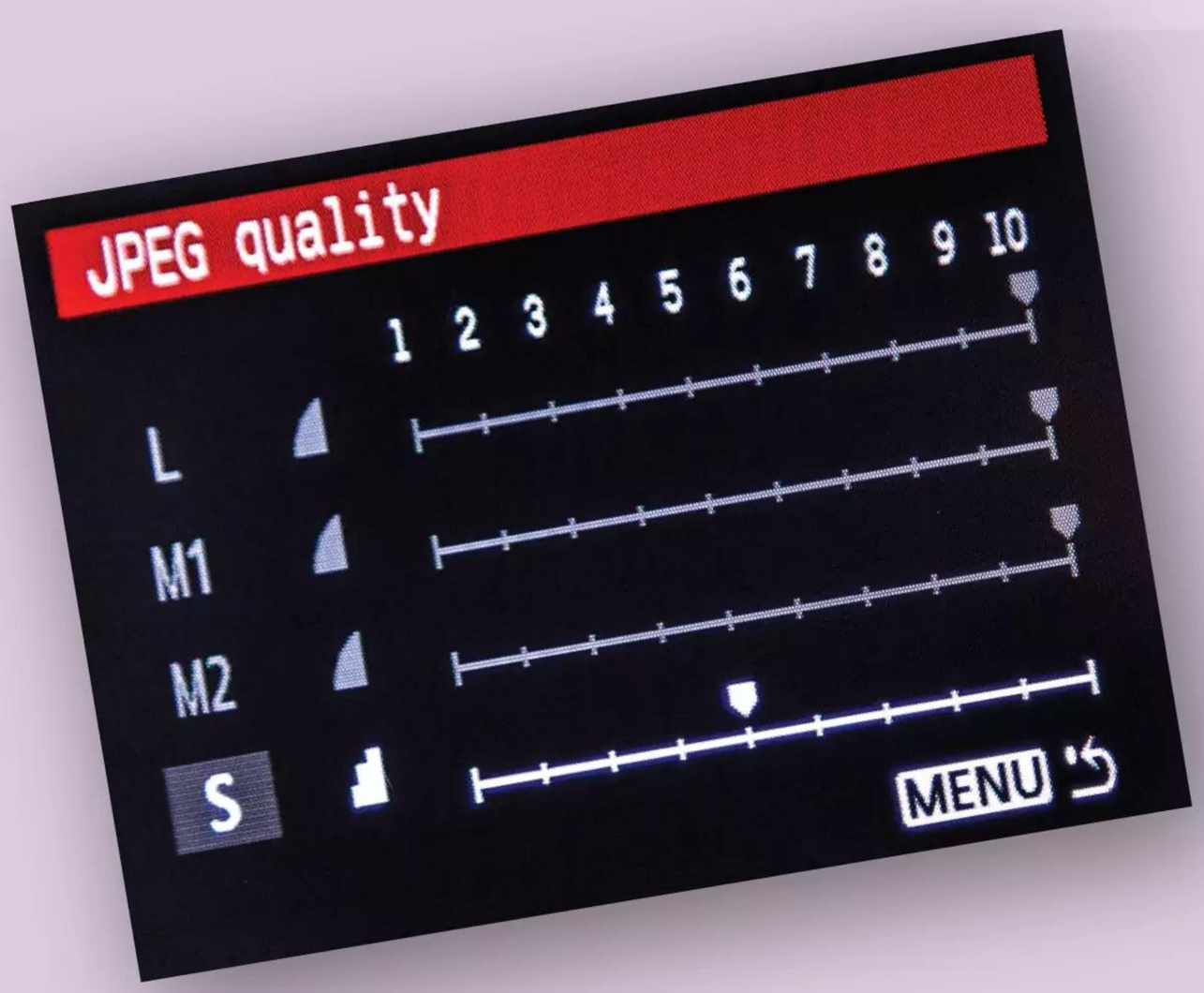
If you've ever edited a photograph on your computer using Photoshop, Gimp, or any of the main image editing programs, you may have noticed a disparity between the size of the image as displayed in your computer's file manager, and the size of the image once opened for editing. That image of the Lake District you took was about 4MB according to your file manager, but Photoshop is telling you it's actually 35MB. Well, thanks to some clever maths and algorithms, image compression is at work here. We'll start with the one you've all probably heard of which is the JPEG.

File compression uses complex mathematical algorithms to squeeze big image files into small spaces, but quality can suffer.

The JPEG standard also happens to be an ideal format for storing pictures on a digital camera, because it uses something called file compression. This is a technique that allows a large number of images to be stored in a relatively small amount of memory by squashing the files so they take up less room. For this reason JPEG has become the standard image file format for all digital cameras.

A full technical explanation of file compression would fill a decent-sized textbook. It uses complex mathematical techniques that you simply don't need to know unless you're a software engineer working on a new digital camera. As consumers, all we need to know is that it reduces the size of the picture file by reducing the amount of information stored in it. JPEG compression reduces file size by reducing picture quality, and for this reason it is called 'lossy' storage. For most purposes this quality reduction is imperceptible and fine for day-to-day use, but for maximum image quality there are other types of image file which are uncompressed and lose no quality, the most common one being TIFF, which stands for 'Tagged Image File Format'.

Basically, the way JPEG compression works is like this. An average digital photograph contains



> "For maximum image quality there are other types of image file which are uncompressed and lose no quality, the most common being TIFF."

Large areas of low detail, such as the sky, can be easily compressed, while detailed areas such as the trees and grass contain more information.

varying levels of detail. For example, take an average image shot in your local park on a sunny day. While the main subject, the leaves, trees and grass in the foreground, contains a lot of detail, there will also be large areas such as the blue sky that will contain relatively little detail. In order to reduce the size of the file, some data from the lower detail areas can safely be lost without affecting the quality of the picture too much. The way this is done is usually by reducing the number of tonal variations between areas of similar colour, so you may notice artefacts that look like squares or stripes in highly compressed images.

Whatever make or model of digital camera you have, it will almost certainly have an option in the menu that allows you to select image quality. If you select the lowest quality, you will probably find that you can fit about four times as many images onto your memory card as you can at the highest setting. The higher JPEG compression setting makes the files one quarter as big, but reduces the quality of the picture to compensate. Most people will use the highest setting most of the time, but unless you intend to print all your pictures at the largest size possible, you can get away with using a lower quality setting and still have pictures to be proud of. ■

COMPRESSION SETTINGS

Even shooting at your camera's lowest quality setting will still produce acceptable results under most circumstances. These three photos were taken using a DSLR using the Maximum, Medium and Minimum quality settings. As you can see the differences are very hard to spot.

The next picture is the same Minimum quality shot as above, but resaved as a JPEG using Adobe Photoshop using the Medium compression setting. While the quality is a little lower, the image is far from useless.

For comparison, this next image takes the Minimum quality original and is then resaved in Photoshop using the Minimum quality compression settings. Now more compression artefacts are visible in the image.

The right mode for the right conditions

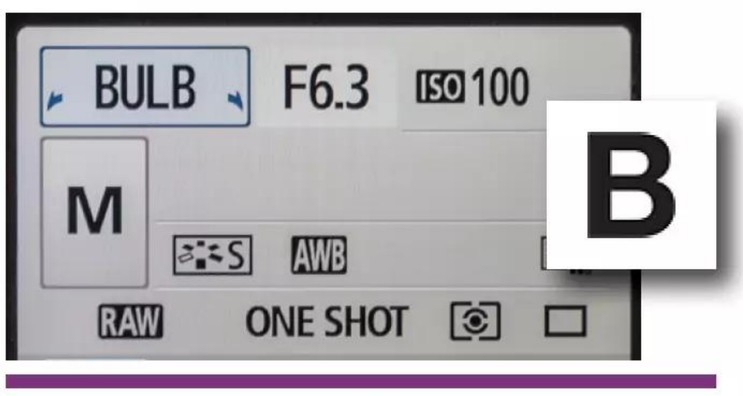
If you're trying to capture fast action on the football field or a sweeping panorama, there's a mode for that

Sometimes it's great to set your camera on a particular shot mode setting knowing it will take care of business for you in your particular shooting environment. This means that you can get on with just enjoying taking the shots you want. Most new compact cameras, mid range compact system cameras and DSLRs offer a range of modes or creative options that you can choose. There is a mode for action and sports that means your images of the important football match are shake free and the action is frozen. There is also a landscape mode that boosts saturation and contrast for vibrant green and blues, as well as using narrower apertures to give you as much depth of field image sharpness as possible.

Here are some of the most often used modes selected from the mode dial on the top of the camera and in some cases, from the menu screen on the back of the camera. ■

Auto DOF Mode: As you focus on your subject, the camera will use the other focus points to measure the distance of the other objects in the viewfinder. It will determine what the appropriate aperture setting should be to render everything in focus.

Bulb Mode: Lets you control both shutter speed and lens aperture independently. Many cameras offer a Bulb shutter, allowing long exposures for as long as you hold the shutter button down. In some cameras, Bulb mode can be set from the command dial or through the menu screen.



Manual Exposure: This mode provides the same range of exposure control as the other shooting modes, but lets you control both shutter speed and lens aperture independently for more creative control.

Aperture-Priority AE: This allows you to set the lens aperture, while the camera is left to select the most appropriate shutter speed. You have control over all the other exposure variables, including the control of exposure compensation.

Full Automatic Mode: Full Automatic is indicated on the Mode dial by a green rectangular outline. In this mode, the camera makes all exposure decisions with the exception of image quality. Autofocus mode is set to AI Focus.

Close-up Mode (Macro Mode): Turning the Mode dial to the macro flower symbol sets the camera for capturing smaller subjects such as flowers, morning dew on grass, and other small details. The autofocus mode is automatically adjusted to One Shot.

Shutter-Priority AE: You can manually set the shutter speed you want to work with, while the camera chooses the best corresponding aperture setting. You have control over all other exposure variables, including exposure compensation.

Flash Off Mode: Flash Off mode disables both the internal flash head and any external flash unit connected. Focus is set to AI Focus mode, the AF assist lamp disabled. ISO and white balance are set automatically as well.

Sports Mode: This mode uses a faster shutter speed to capture fast-moving subjects like football players or racing cars . The autofocus mode is automatically set to AI Servo to predictively track your subject and keep it in focus as it moves.

Creative Auto Mode: When set to CA mode, the camera allows the user to adjust picture style, motor drive, and exposure compensation, as well as to use the program shift function.

Portrait Mode: This mode uses a large aperture setting to decrease the depth of field, which blurs the background to emphasize the subject. ISO and white balance are set to Auto.

Night Portrait Mode: This mode is for taking pictures of subjects at sunset or at night, letting the flash illuminate the subject, while the longer exposure provides a brighter view of the landscape around the subject.

Program AE: Similar to the Full Automatic mode, but allows more control over the exposure variables. Aperture and shutter speed are automatically selected by the camera, but you can alter exposure to different apertures by turning the Main dial.

Landscape Mode: Landscape mode combines slower shutter speeds with smaller aperture settings to increase the depth of field when shooting broad panoramas, sweeping landscapes or any outdoor subject where you want as much sharpness as possible.

Movie Mode: When Movie mode is selected, the camera's mirror and shutter open, as in Live View mode, but the Live View / Movie button on the camera's back functions as the start/stop button for movie recording.

Staying focused

Don't miss out on a good photo due to incorrect focusing

It's your child's sports day. They are taking part in the 100 yard dash and they are going to win. Standing by the finish line, you steady your camera and take a shot as they race over the line in triumph with another child in close second. When you finally review the image, you child is blurred, but the child behind them is in sharp focus. The image is useless. What happened? Well, you've just fallen victim to autofocus. Your camera decided that because of the various objects in the scene, and what it could actually lock on to, the second child was what it thought should be in focus. Autofocus is a great tool, but it does need your input now and again to keep it in line.

Although we now rely on autofocus for the vast majority of photographs, anyone who has tried taking a photo in low light, with fast-moving subjects or using very long telephoto lenses will have noticed that sometimes even the best AF system can run into problems. We've all stood there with the lens whirring in and out of focus, trying to get a lock on our subject, and eventually missed the shot. It's very frustrating when this happens, but with a few simple tips you can help your camera to focus quickly and accurately even in difficult situations.

There are two main types of autofocus system in common use today. All compact cameras and most CSCs use something called contrast-detection AF,

To get this flower in focus, the camera was put on a tripod and manually set to get the exact part of the flower required in sharp focus, rather than relying on the autofocus system.

Different lenses have different minimum focusing distances, but many modern zoom telephoto lenses also have macro-focusing capabilities for close-ups.

press the shutter button. In continuous focus mode it will continue to update the focus if you then move the camera, but in single AF mode it will hold the same focus setting as long as you hold down the button, until you actually take the shot. You can use this to focus the camera on low detail targets by finding an object in the scene that's the same distance away as your chosen subject, focusing on that, and then holding the focus and reframing the shot. Similarly you can use it in reverse to focus on objects that aren't in the centre of the frame.

Moving targets

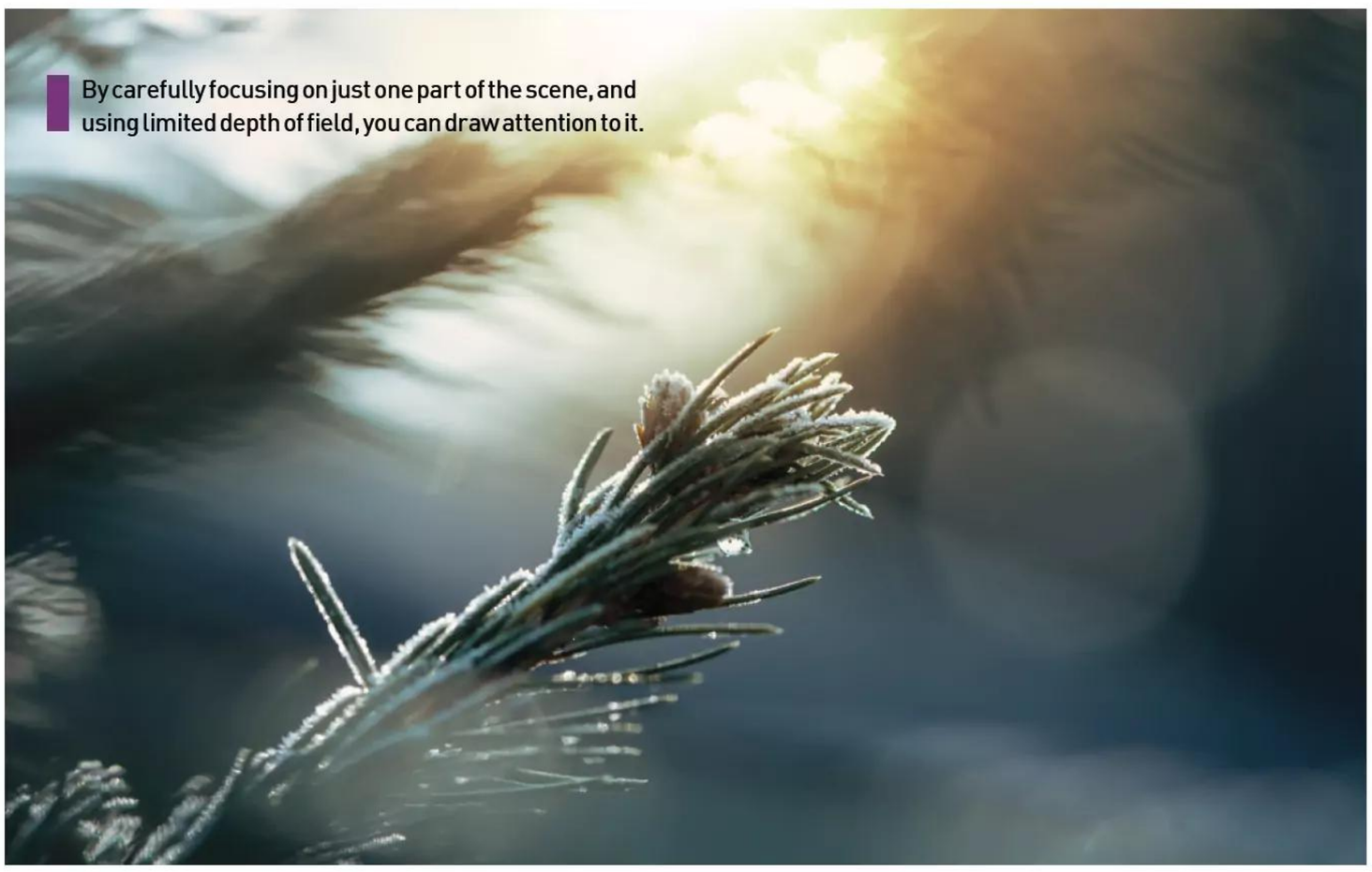
Compact camera AF systems are usually somewhat slower than those in DSLRs, which means they can have a real problem focusing on moving subjects. The way around this is either to use continuous AF or, if your camera has this option, to use manual focus. If you can tell where your subject is going to be, such as a car going round a tight corner on a race track or a child on a swing, you can pre-focus the camera on this point and wait to take the picture at the right moment. This method takes some practice and good reflexes, but it can produce excellent results.

Close-ups

All cameras and lenses have a minimum focusing distance, a closest point beyond which they cannot focus. For many compact cameras this distance can be very small, in some cases as little as 2cm (1in), but for standard DSLR lenses the distances tend to be longer. Most compact cameras have a 'macro' setting, usually denoted by the symbol of a flower. To get closer focusing with a DSLR or CSC, special close-focus macro lenses have to be used.

Depth of field is greatly reduced at very close focusing distances, and you may find that your AF system doesn't focus on the right part of the subject, for example if you are trying to photograph the centre of a flower, but the AF focuses on the petals, because they're closer. The best option is to use a tripod, and manually set the focus to the closest distance. Move the tripod until the front of the subject comes into focus, then carefully manually adjust the focus point to get the right part of the flower to look sharp. ■

> "Autofocus technology has improved immensely, and these days even the most basic modern AF systems are generally fast, accurate and reliable."



By carefully focusing on just one part of the scene, and using limited depth of field, you can draw attention to it.

which samples the image from the main picture taking sensor and detects sharp high contrast edges in the details of the scene. Meanwhile all digital SLRs use something called phase-detection AF, which uses an array of separate dedicated sensors usually mounted below and in front of the main imaging sensor. Phase detection is a more complex system, but it is usually much faster, more accurate and works better in low light. However both systems require some detail in the scene to 'lock on' to. Try it for yourself: point your camera at a plain wall or a sheet of white paper and see if it will focus on it. Even if you own a top-of-the-range DSLR it won't be able to focus on a featureless surface.

There are a couple of ways to help your camera to focus quickly on a scene. Most digital cameras have the option to select either single or continuous autofocus. Your camera will normally start to focus on the scene as soon as you half-

How shutter speed affects your photos

Some simple tips that keep your photos sharp

"The wider the range of available shutter speeds, the greater the creative versatility of the camera."

From birds frozen in flight, to water looking more like fog. Those shots are created by using your camera's shutter speeds in different ways to create a range of visual effects in your photos. The shutter of your camera is simply a mechanical barrier that prevents light from entering the camera until it is needed, controlling when and for how long light is allowed in to expose the sensor. **The latest digital cameras have high-speed electro-mechanical shutters capable of timing exposures with an accuracy measured in fractions of a millisecond.**

Along with the aperture setting and the sensitivity control, shutter speed is one of the three ways that photographic exposure is adjusted. When a picture is taken, the shutter is opened for a precisely measured amount of time allowing light to pass through. The duration of the exposure is set either automatically by the camera's light meter or manually by the photographer. The wider the range of available shutter speeds, the greater the creative versatility of the camera.

Modern digital SLR cameras have a very wide range of shutter speeds available, usually ranging from 30 seconds to as high as 1/8,000th of a second, and most also have a 'B' setting, in which the shutter stays open for as long as the shutter release is held down. The 'B' is from bulb. Very old cameras commonly used an air-bulb attachment as a remote shutter release.

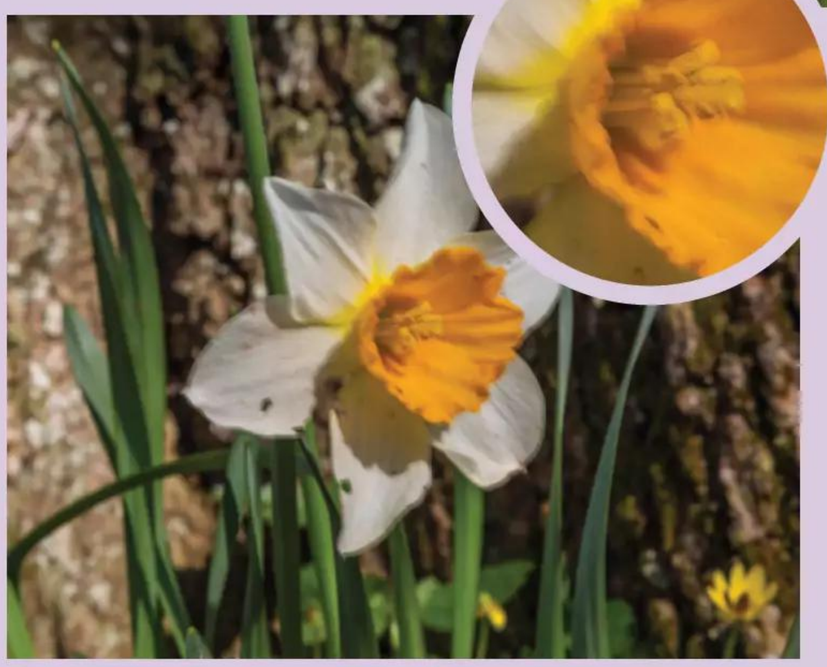
Shutter speed can be manually adjusted in either full manual exposure mode or in shutter priority mode, the latter usually denoted by an 'S' or 'Tv' on the exposure mode dial. Shutter priority is a semi-automatic exposure mode in which the photographer sets the desired shutter speed, and the camera's exposure system adjusts the aperture accordingly to produce the correct exposure.

In automatic and program exposure modes the camera will set both the shutter speed and aperture automatically. Under normal daylight conditions, the shutter speed will usually be set to between 1/125th and 1/1000th of a second, since this is fast enough to freeze most movement and to reduce the effects of camera shake. However in low light conditions the camera may set a slower shutter speed, and with this comes an increased risk of movement blur caused by camera shake. Most cameras will display some sort of warning if this occurs. ■

AVOIDING CAMERA SHAKE

When shooting hand-held and wishing to avoid camera shake, as a rule of thumb you can safely use a shutter speed roughly equivalent to the reciprocal of the focal length you are using. For example if you're using a 100mm focal length then you can take a sharp hand-held shot at a shutter speed of 1/100th of a second or faster. If you're using a 35mm focal length then 1/35th of a second is safe, and so on.

Here's an example shot taken hand-held at a focal length of 100mm and a shutter speed of 1/100th of a second. As you can see it's sharp and shake free.



Here's the same hand-held shot but this time with a shutter speed of 1/10th of a second. At this speed and focal length it's much more difficult to hold the camera steady. As you can see, the result is quite blurred.

Many modern cameras include technology which can reduce the effects of camera shake at low shutter speeds. Many compact cameras use electronic processing to counteract movement, which does work but produces relatively poor image quality. Among digital SLR and CSC manufacturers there are two types of image stabilisation in common use. Canon, Nikon and Panasonic favour optical stabilisation, where elements within the camera lens are moved to counteract camera shake. Other brands including Pentax and Sony employ a system which moves the camera's sensor to achieve the same effect.

There is no clear advantage between moving-lens and moving-sensor systems. Modern image stabilisation systems of both types can provide around three or four stops of additional stability, however the sensor-shift method has an advantage for SLR users because the non-stabilised lenses are usually considerably lighter and are often also cheaper to buy, since the complex anti-shake system is built into the camera body. It also means that photographers using older predigital lenses can still have the advantage of image stabilisation.

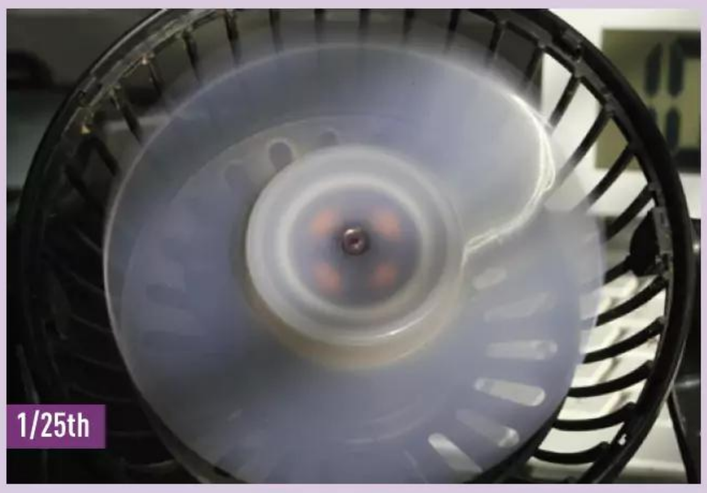
This example shot was taken with a focal length of 100mm at 1/10th of a second as before, but this time the image stabilisation is switched on. It has detected the vibration and corrected it by moving the sensor to compensate, resulting in a much sharper shot.

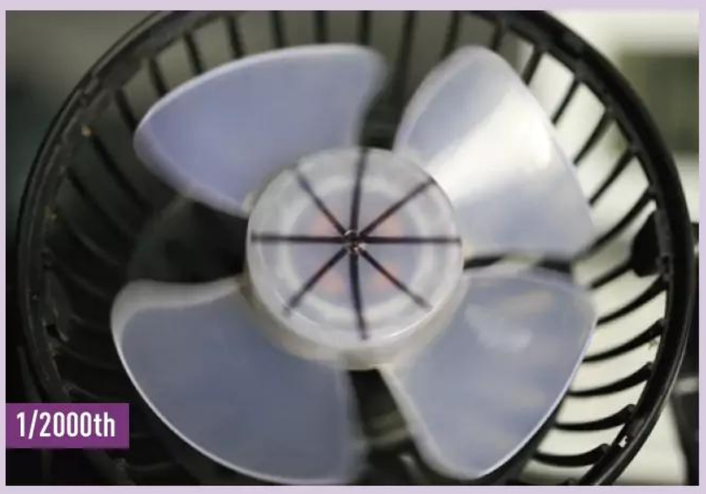
MOTION BLUR

Any movement in the frame during the exposure will be captured in the picture, resulting in motion blur. Anti-shake systems can do nothing to correct this; the only solution is to use a shutter speed fast enough to effectively freeze the action and eliminate any sense of motion. With a fast enough shutter speed you can freeze even very fast-moving objects, as this next sequence of photos will show. They were taken at shutter speeds ranging from a fairly slow 1/25th of a second up to 1/4000th of a second.

As you can see, at 1/4000th of a second the blades of a desk fan can almost be frozen in place.

> **"The solution for motion blur is to use a shutter speed fast enough to freeze the action."**

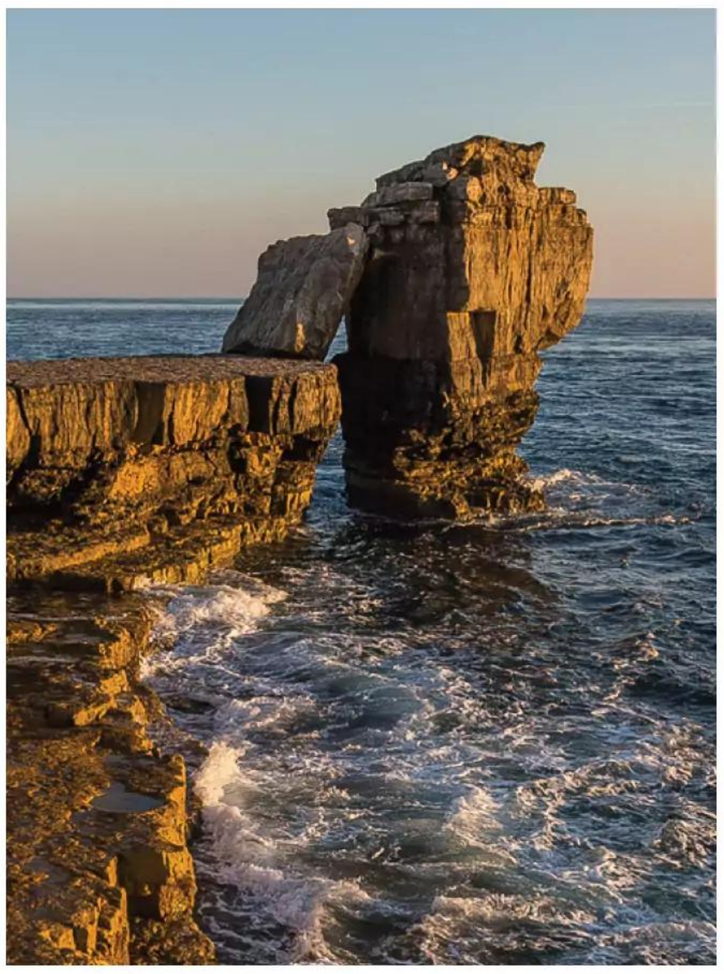




THE MISTY WATER EFFECT

One of the most effective uses of long shutter speed is photographing flowing water. It's a beautiful if slightly over-used effect, but it is very easy to achieve. Any moving body of water, flowing stream or waterfall will do, as long as it has white splashing water. This scene is Meadfoot beach on the Devon coast.

If you just point the camera and shoot on automatic, you'll end up with something like this (below). It looks nice enough, but it's a bit dull. This example was shot on at a shutter speed of 1/640th of a second and an aperture of f8.



Fixing the camera on a tripod eliminates camera shake. You now need to get the slowest shutter speed you can. The image at the top of the page was taken from a similar position as the previous shot, but with the addition of a 10stop ND filter to give a shutter speed of 30 secs and an aperture of f9.

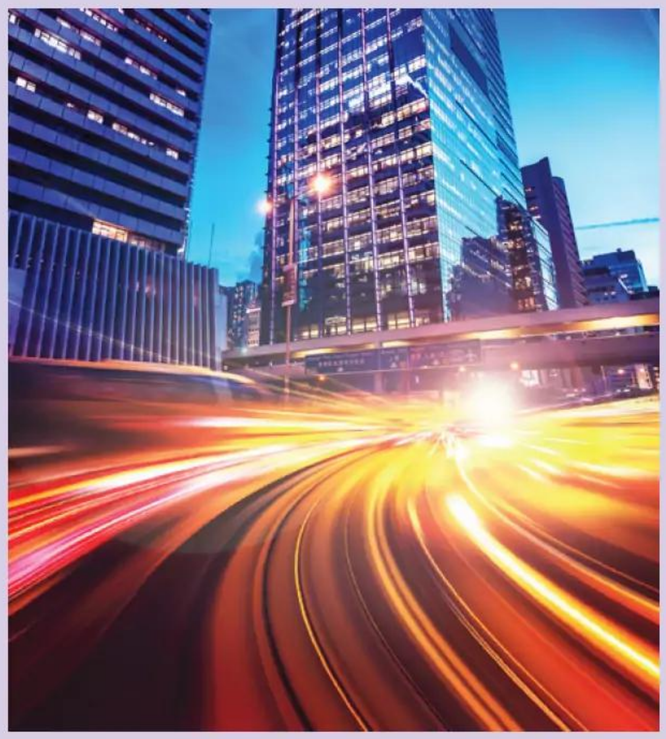
CAPTURING MOVEMENT

Freezing the action with a fast shutter speed produces a nice sharp image, but sometimes you might want to allow a controlled amount of movement blur to show that the subject was in motion. There are a number of ways to accomplish this.

In this first movement example, the camera was held motionless, with a shutter speed of 1/1000th of a second, while the car drove past in front of the lens. No camera movement ensures that the background is sharp and the fast shutter speed has frozen the movement. The result is sharp but looks slightly odd, as though the vehicle is now simply at a standstill.

In this additional example, this time with the camera mounted on a tripod, the settings were adjusted to allow a shutter speed of 1/30th of a second, and another vehicular subject is allowed to drive past. This time the background remains sharp, but the slower shutter speed has resulted in lots of movement blur, making the car appear to streak across the frame and remove any sharp detail.

In order to capture the feeling of movement (top image), the best technique is to use a slow shutter speed, but to pan the camera (move it side-to-side) to follow the moving subject as you press the shutter. It is a technique that requires practice, since you need to be able to keep the camera moving smoothly as the exposure is taken, and avoid up-and-down movement as you press the shutter. It may take several tries to get it right, but when it works the results are very effective, with the subject stationary against a movement-blurred background. This shot was taken hand-held at a shutter speed of 1/50th of a second. Some recent cameras have a setting on the image stabilisation system to correct vertical movement but not horizontal, which helps with this kind of shot.



CAR LIGHTS AT NIGHT

Another interesting effect achieved using long shutter speeds is streaking car lights at night. The camera was set up on a tripod, using manual focus and full manual exposure, with a cable shutter release. Starting with an aperture of about f/4, you will need to dial in your settings to get a balanced exposure. If your exposure duration is still too short, stop your aperture down to f/5.6 or smaller until you get a longer exposure duration that renders car lights as long streaks. Generally, a shutter speed of around 4 seconds is a good starting point.

When shooting near heavy traffic at night it's obviously important to stay safe. Wear something bright and reflective, and don't get too close to the road. Also, never use a flash when taking photos of traffic. You could dazzle a driver and cause an accident.

FIREWORKS

One way to take good fireworks photos is to set your camera on a tripod some distance from the display, with the zoom set to a very wide-angle. Set a shutter speed of 2 seconds and as wide an aperture as you can manage. Getting the framing exactly right is simply a matter of luck, timing, and then cropping the photo later.

Changing your view with focal length

Focal length is another great compositional and creative tool to use in your outdoor photography

Whether it's the smallest flower filling the frame of your viewfinder, or the sweeping vistas of the high moors and dales, these images would not be possible to capture without the aid of different focal lengths, giving you very narrow or very wide angles of view. A zoom lens allows you to choose a wide angle of view, or zoom in and use a narrower angle of view, magnifying the image. Focal length is one of your primary tools for adjusting composition. Selecting the right focal length for the scene allows the photographer to control perspective, angle of view and magnification, and can radically alter the mood and style of the photo. Some focal lengths are more suited to particular types of photo, and the properties of wide-angle and telephoto lenses can be used to produce particular effects. Understanding how focal length works and how it affects your photos is a vital photographic skill.

LENSES AND FOCAL LENGTH

> "Selecting the right focal length for the scene allows the photographer to control perspective, angle of view and magnification."

There are basically two types of lens: those with fixed focal lengths, also known as prime lenses; and those with variable focal length, or zoom lenses. They both have their own advantages and disadvantages. Prime lenses are usually smaller and lighter than zooms, and also generally have much faster maximum apertures than a zoom lens at equivalent focal length. The optical quality of prime lenses is also usually a little higher than the equivalent zoom lens. Zoom lenses however are much more convenient, allowing the photographer to cover a wide range of focal lengths with just one or two lenses, rather than carrying around a bulky collection of prime lenses. There are some fast zoom lenses, but they tend to be extremely expensive.

The focal length of a lens is an expression of its magnifying power, and is usually stated in millimetres. If you look on the front of your camera, usually inscribed around the front of the lens you'll find the focal length, or a range of values for zoom lenses. For a typical DSLR kit lens this will usually be around 18-55mm.

For digital cameras it is fairly usual to see two figures quoted, both the actual focal length and the 'equivalent' length. The reason for quoting both is simply that most people are more familiar with the sizes of 35mm lenses, so they know that 28mm is wide angle and suitable for panoramic shots, or that 200mm is a telephoto lens, suitable for long-range subjects.

Real and equivalent focal lengths are different because most digital camera sensors are a lot smaller than a frame of 35mm film, and are fitted much closer to the lens than the film would be. Most consumer DSLRs use the APS-C sensor format. Exact sizes vary from one manufacturer to the next, but are typically around 22.5 x 15 mm. A frame of 35mm film measures 36 x 24mm, which means that the edges are 1.6x longer, so the focal length of the lens would need to be 1.6x greater to produce the same image size and magnification. This is usually referred to as the 'conversion factor' or 'crop factor'. It means that a typical 18-55mm DSLR zoom lens is roughly equivalent to the popular 28-80mm zoom lens often used on 35mm systems.

Compact camera sensors are even smaller still. Because there are several different sizes of sensor in common use it is more usual for compact camera zoom lenses to be rated in terms of their magnification power, such as 3x, 4x, 10x etc. This relates to the difference between the minimum and maximum focal lengths. A lens with a range of focal length from 5.8mm to 17.4mm is called a 3x zoom, because 17.4 = 3 x 5.8.

While in older prime lenses a 200mm lens would literally be 20cm long, modern optical systems use multiple lens elements working in combination, which means that the light path can be shortened while still maintaining the same effective magnification. As a result quite powerful telephoto and zoom lenses can be relatively compact.

Wide-angle and telephoto are relative terms. On a 35mm film SLR a 50mm lens produces approximately the same perspective and magnification as the human eye, and has traditionally been the standard lens for this type of camera.

Anything longer than 50mm is considered a telephoto, while anything shorter is considered wide angle. Digital SLRs tend to follow this rule too, although considering the crop factor the mid-point is approximately 35mm.

300MM TELEPHOTO

50-200MM ZOOM

18-55MM KIT LENS

14MM WIDE-ANGLE

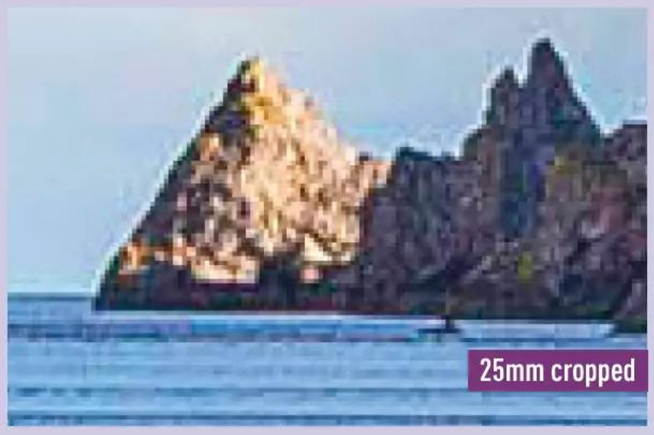
MAGNIFICATION

The most obvious effect of altering focal length is the change in magnification. Anyone who has ever used a zoom lens will be familiar with this effect. If you want to take a photo of something a long way away, you zoom in and the subject appears closer.

This series of photos shows the effect of a wide-angle zoom equivalent to 25mm, medium zoom of 100mm and a telephoto of 400mm, all taken from the same position.

What is happening here is not the subject being brought closer, but the angle of view being reduced so that a smaller proportion of the scene fills the frame of the sensor. If we look at a cropped-down section of the centre of the wide-angle 25mm view we can see that it looks very similar to the 400mm view, although rather less sharp, because this cropped-down section of the frame obviously has far fewer pixels than the full-frame zoomed-in image. This is the way that digital zoom works on a compact camera, and is why digital zoom should never be used as a substitute for optical zoom.

> "A cropped-down section of the frame has far fewer pixels than the full-frame zoomed-in image."



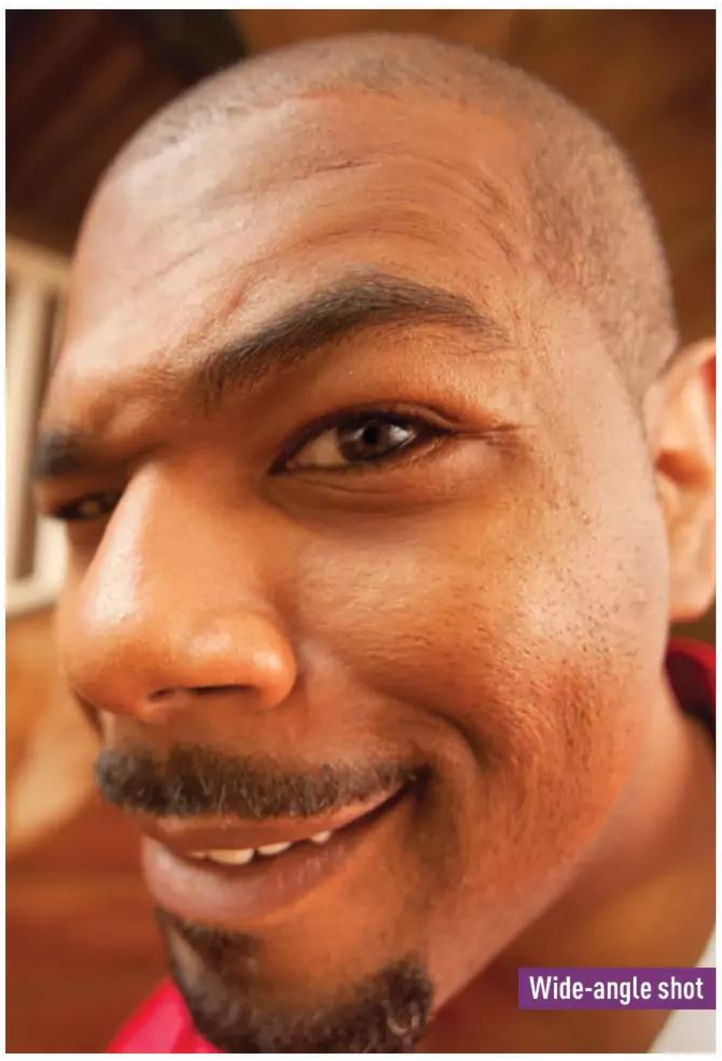
As you can see, cropping the wide-angle image produces the same effect as zooming in, but greatly reduces quality.

ANGLE OF VIEW

Changing the angle of view can be used to produce some interesting effects. If we move closer to the subject while shortening the focal length we can see that although the subject fills roughly the same area of the final image, in a wide-angle shot a lot more of the background is included.

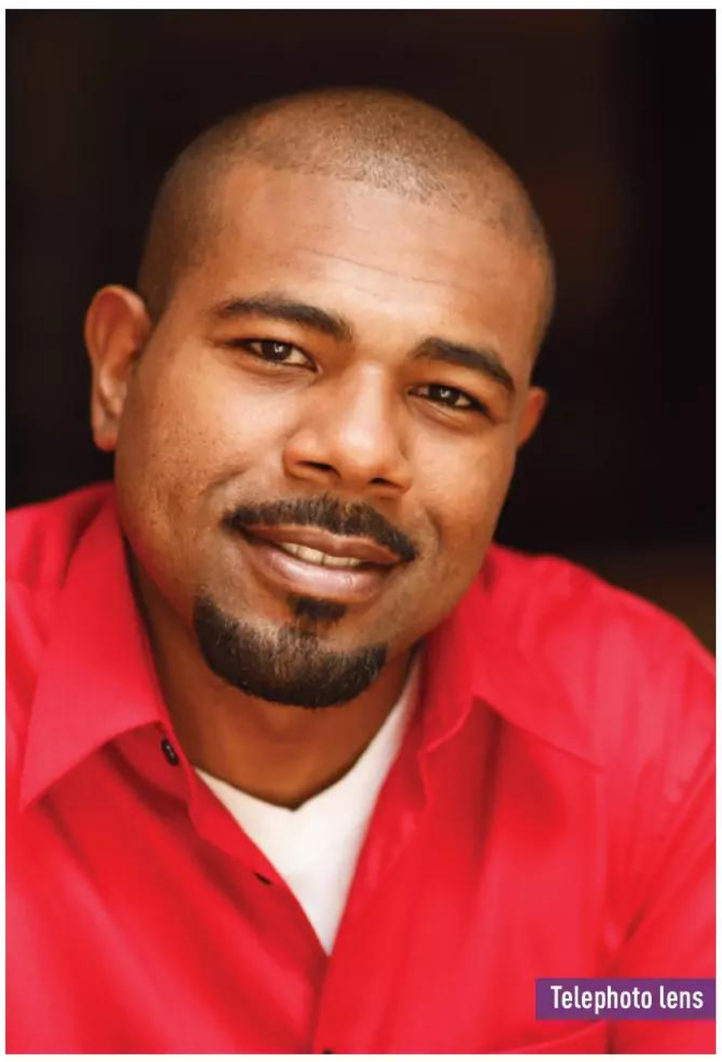
Take a look at this series of five pictures, each one taken at approximately half the focal length of the previous one. As the focal length is reduced more of the background comes into view behind the subject, while objects in the foreground appear much closer to the camera, increasing the appearance of extreme perspective. Watch out for unflattering distortion on human subjects as you get closer to them and shorten the focal length.

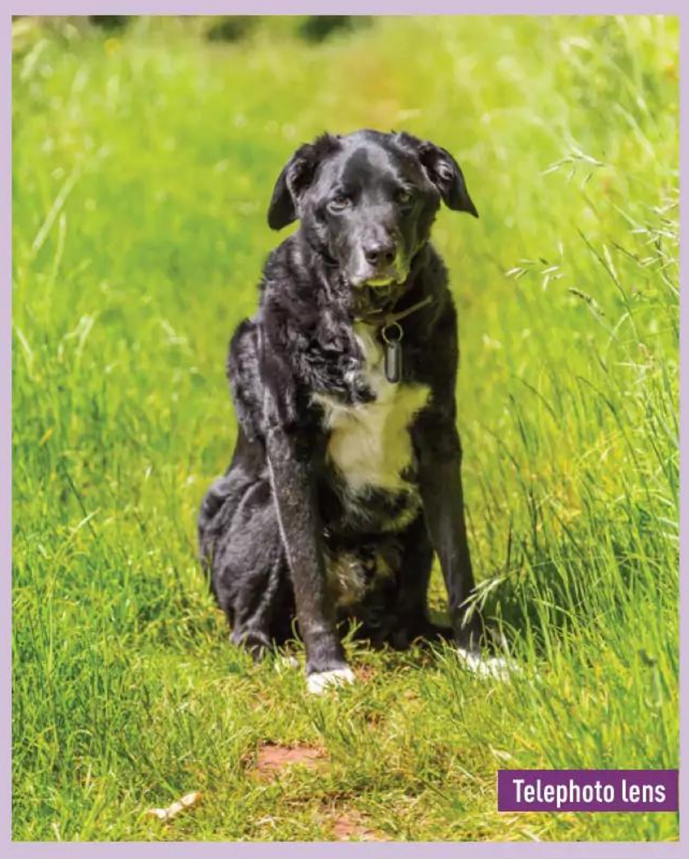
DISTORTION

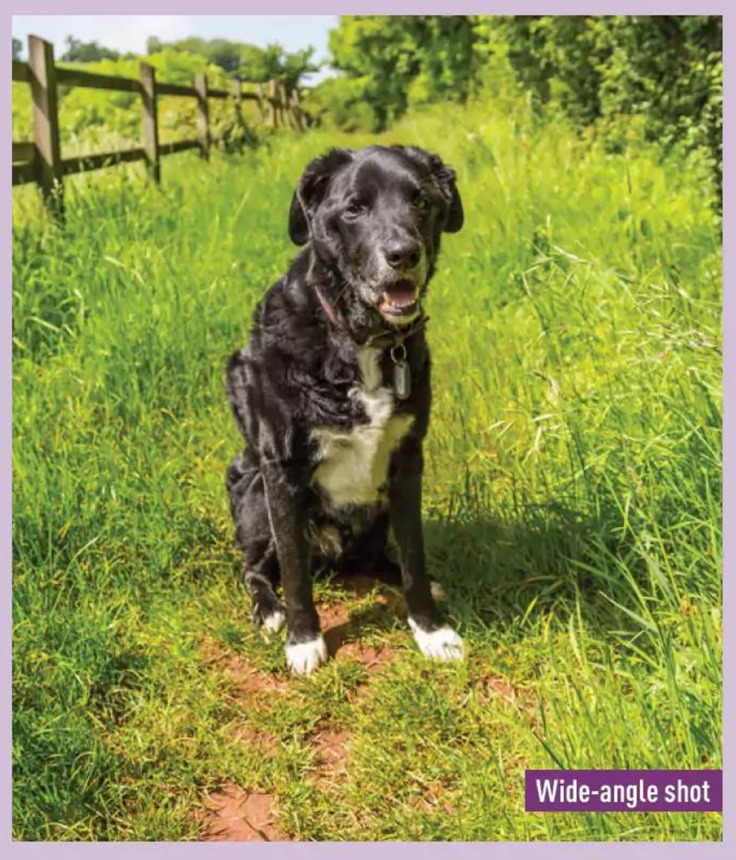

Wide-angle shot

Changing the angle of view is important to remember when shooting portraits. If you use a short focal length to take a facial portrait at close range the parts that are closest to the camera will appear disproportionately larger, distorting the facial features. The result is a 'ballooning' of the face as it appears to bulge outwards, like a reflection in the back of a spoon: not such a flattering look, as illustrated above.

Most portrait photographers prefer to step back a little and zoom in. The most popular choice is a focal length of about 80-100mm, since this gives a flattering, natural-looking perspective.

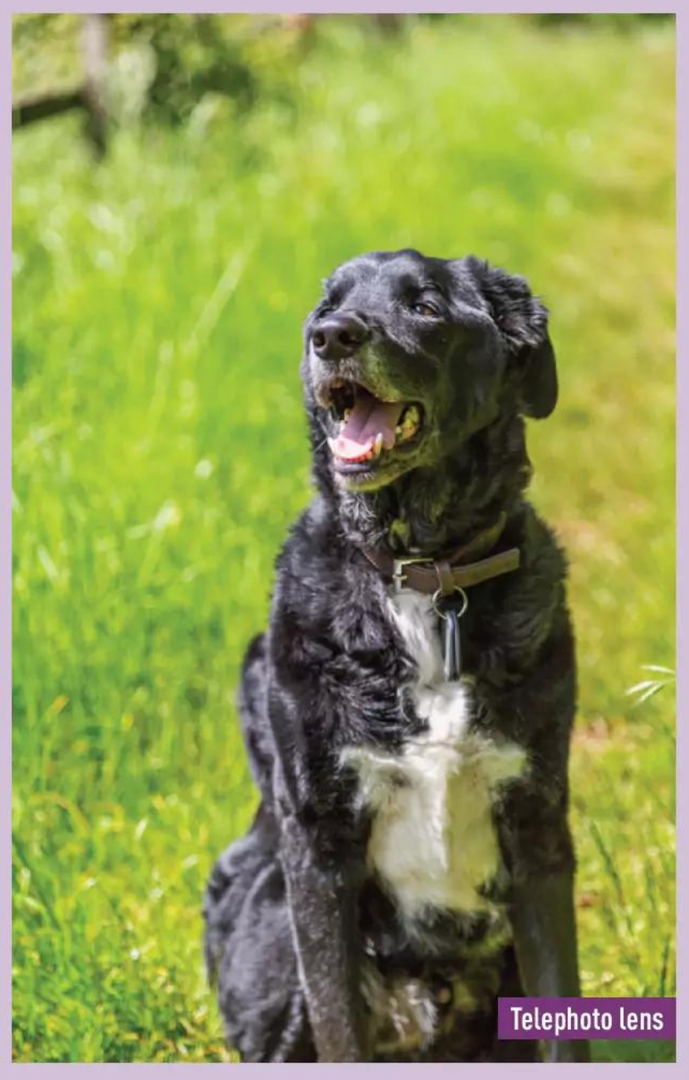

Telephoto lens

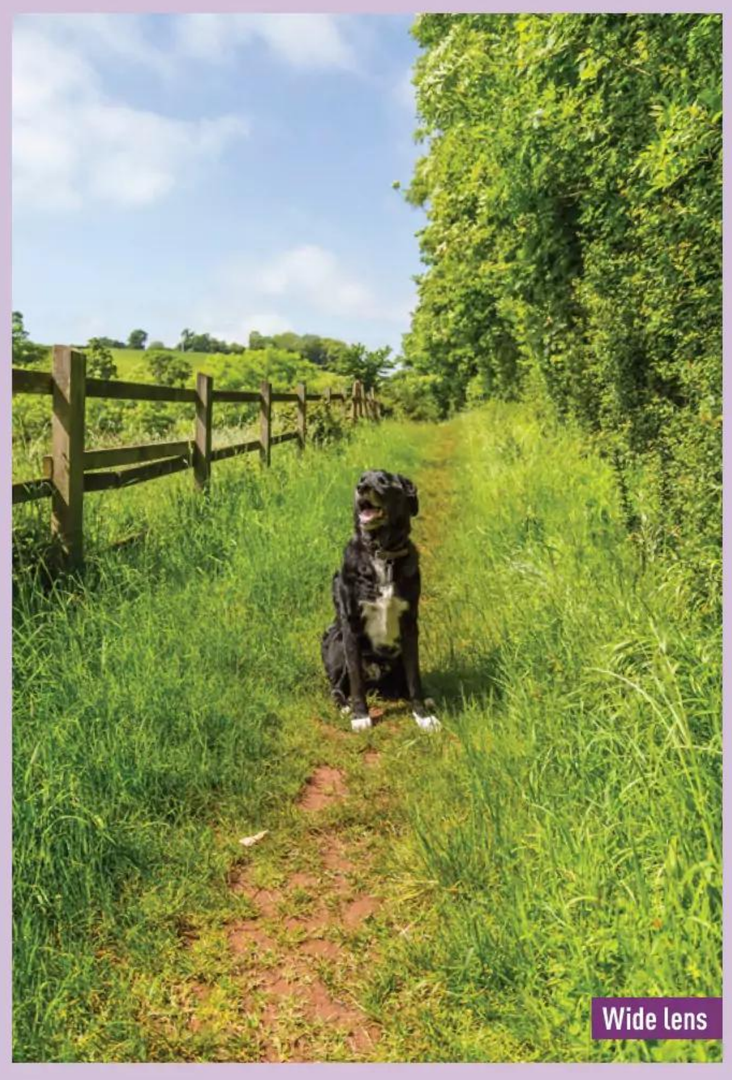

Telephoto lens


Wide-angle shot

DEPTH OF FIELD

The perspective-flattening of long lenses can also be used in other circumstances, such as drastically reducing depth of field. You can use this to isolate a subject by blurring out the background, as in the shot above on the left.
Compare this with the same shot on the right, but taken with a wide-angle lens from a much closer range. The relative size of the subject is the same in both shots, but due to the increased depth of field in the wide-angle shot, the background, although apparently more distant, looks sharper.


Telephoto lens


Wide lens

TELEPHOTO LENS

Careful focusing with a long telephoto lens can pick out individual subjects despite busy surroundings, such as focusing on a student at a school music festival. A similar scene shot using a wide-angle lens presents a very different image. The examples we've used here are extremes intended to emphasise the effects we're demonstrating, but in fact a lot of people only ever use their zoom lenses at either maximum or minimum settings. Don't do this out of habit; instead use the full range of the lens to explore all the different possibilities it offers. Focal length is one of your primary creative tools, so make good use of it.

Using a very wide aperture and precise focusing, emphasis can be given to one subject to effectively isolate it from its surroundings.

Understanding how aperture works

Aperture can control how much of your picture is sharp and how much is out of focus

WIDE APERTURE

NARROW APERTURE

Apart from the role that aperture plays in controlling the exposure in your image, it is also the key ingredient in defining how much of your image is sharp and how much is out of focus. If you want your landscape shots to be as sharp as possible from front to back, or you want a close-up of a butterfly to be the only thing that is sharp in the scene, then it's aperture that will do that for you.

The aperture is literally a hole through which light passes after it enters the lens. The diameter of this hole can be altered, allowing a greater or smaller amount of light to pass through on its way to the sensor. In the early days of photography, aperture was adjusted by slotting cards with different sized holes cut in them into the body of the camera behind the lens. These cards were known as 'stops', and this is still part of photographic terminology today. On modern cameras the aperture is controlled by an arrangement of curved shutters inside the body of the lens, which move to produce a continuously variable aperture, however the aperture settings are usually still referred to as 'F-stops'.

Aperture adjustment is used in combination with the shutter speed and ISO sensitivity to control photographic exposure. However it is also the primary means of controlling something called depth of field, a concept that may need a bit of explanation if you haven't encountered it before.

If you take a photo of a subject at a distance of about 3 metres with standard zoom lens, in good light with the focal length set to about 30mm, as

> "Understanding the effects of aperture size is a vital skill for any keen photographer."

long as the lens is focused correctly the subject should appear nice and sharp in the image. However you'll usually find that objects about 1.5m in front of the subject, and for about 4 or 5 metres behind the subject, also appear sharp. This distance, from the closest point of acceptable sharpness to the most distant, is known as the depth of field.

By altering the size of the aperture it is possible to control the extent of this depth of field, either reducing it so that only the main subject is in sharp focus, or expanding it so that an entire landscape can appear to be just as sharp.

If you have an older camera to hand, take a look at the lens. It will have a ring for controlling the aperture setting, labelled with numbers usually from about F2 to about F22. The focus control ring will have distances usually calibrated in feet and metres, and alongside it you'll usually find lines marked with the same numbers as the aperture ring, arranged in pairs either side of the focal distance mark with the larger numbers toward the outside. The purpose of this aperture scale is to help estimate the depth of field at a particular distance for any given aperture setting; with the focus set to a particular distance, anything between the two lines for the selected aperture setting should be acceptably sharp. Some older zoom lenses have a series of curved lines etched into the lens barrel for the same purpose. For some reason this scale is missing from most modern auto-focus, auto-aperture lenses, which is a shame because it makes the whole concept of depth of field much easier to understand.

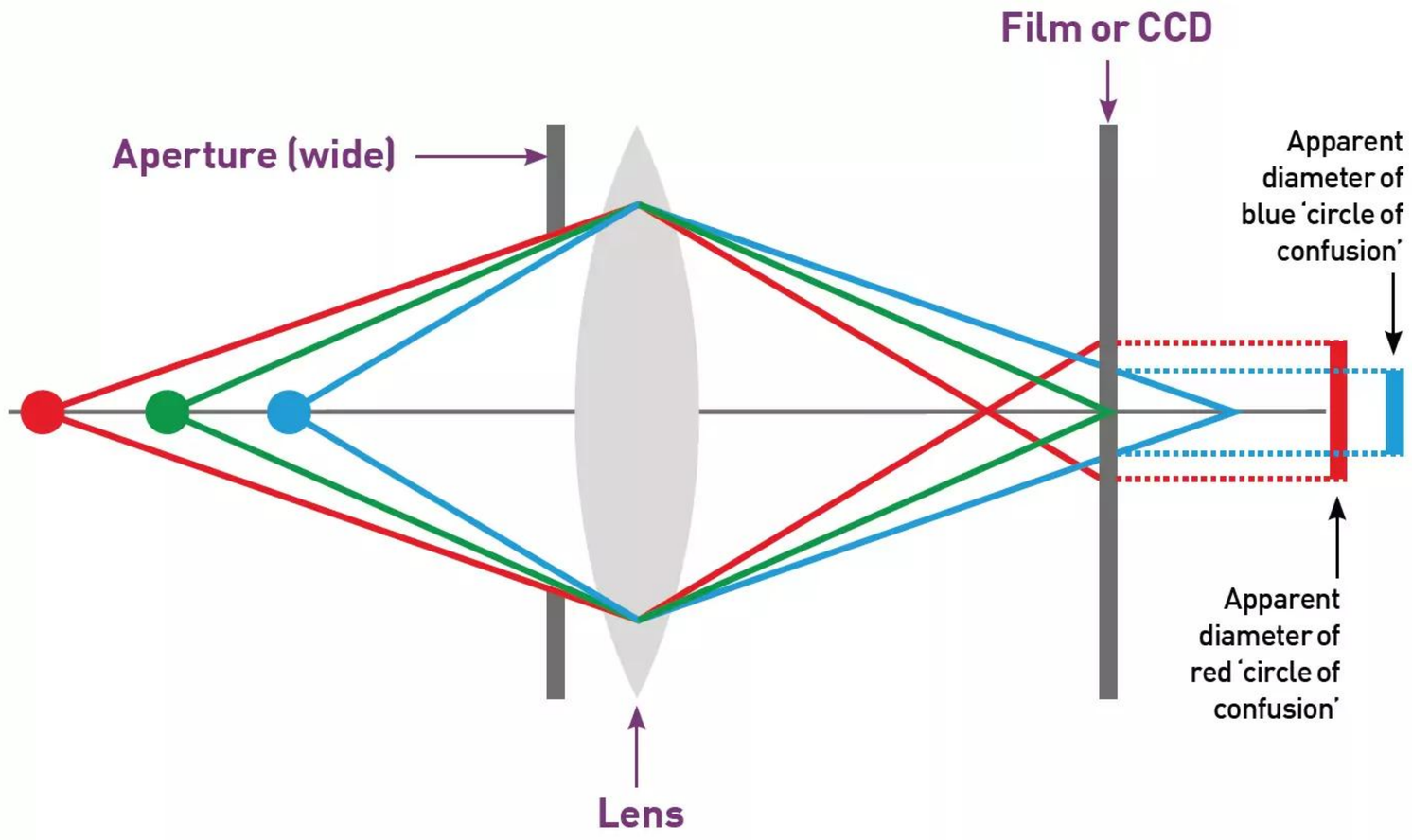
APERTURE RING

How aperture works

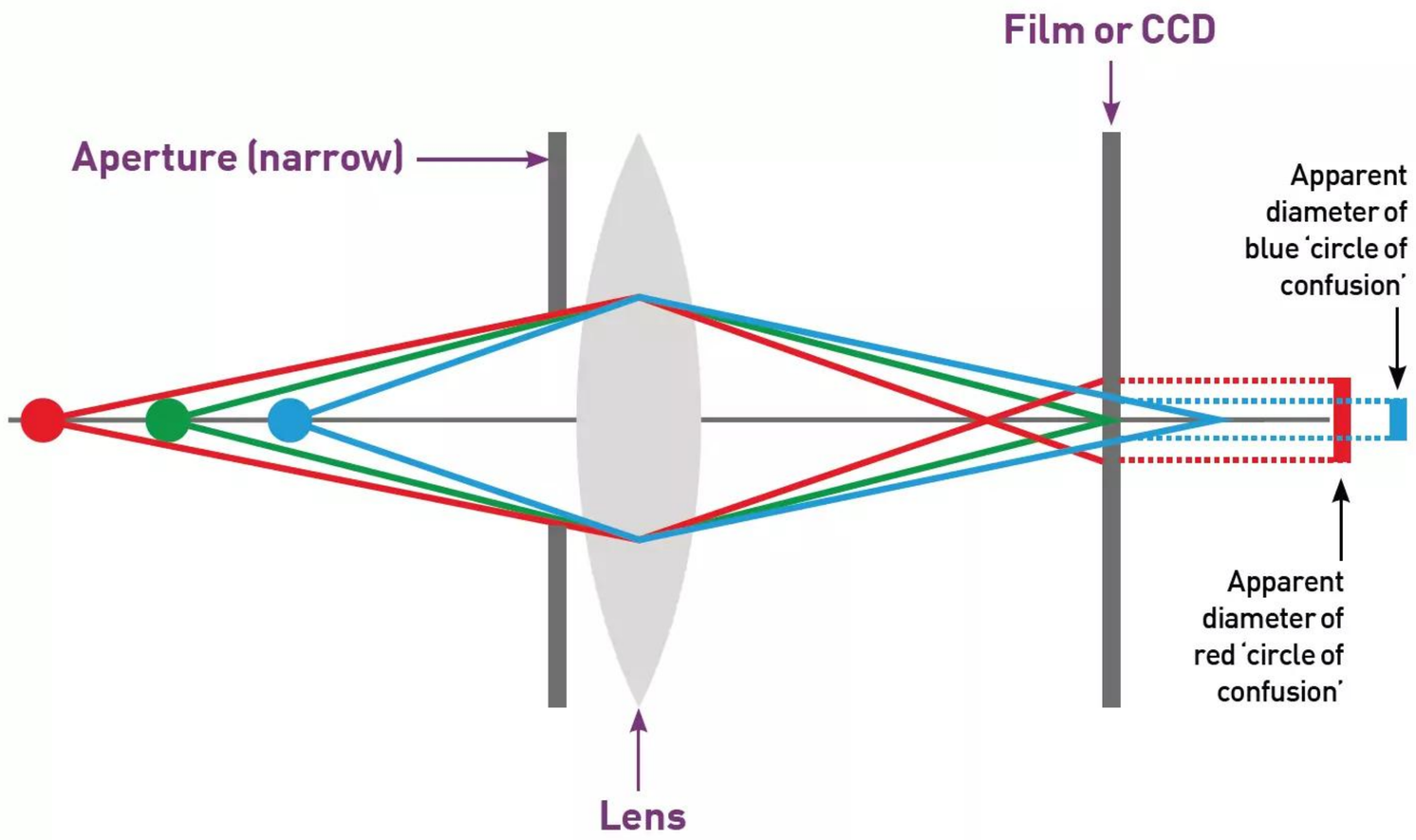
Explaining exactly why altering the size of the lens aperture alters the depth of field is a little complicated, but a few simple diagrams should help to shed some light on the matter. For a start, let's clear up some popular misconceptions about the difference between focus and sharpness.

This is a highly simplified diagram of the arrangement of lens, aperture and sensor inside a modern digital camera. In this first diagram, three subjects at different distances from the camera lens are represented by the red, green and blue dots. The lens is focused on the green spot, so light from it passes through the aperture and the lens and appears sharply focused on the sensor. Light from the red and blue spots also passes through the aperture and lens, but light from the red spot focuses a short distance in front of the charged coupled device (CCD), while light from the blue spot focuses a short distance behind it. The light from these other spots still hits the CCD, but due to light scattering it is unfocused and spread over a wide area.

What this means is that the red and blue spots will appear as large blurred spots on the final image, while the green spot will be sharp and in focus. The size of the blurred area of the red and blue spots is called the 'circle of confusion.'


Film or CCD
Aperture (wide)
Apparent diameter of blue 'circle of confusion'
Apparent diameter of red 'circle of confusion'
Lens

The diagram below shows the same arrangement of camera and subjects, and the coloured spots are the same distance from the lens, but this time the aperture has been reduced to just a small hole. Again the lens is focused on the green spot, and the red and blue spots are out of focus. However the narrow aperture restricts the light scattering and the relative angles of the light paths, and as a result the 'circles of confusion' are much smaller. This makes the red and blue spots in the final image appear much sharper. They are still out of focus, but the effect is not so noticeable. To make circles of confusion as large as in the first image, the red and blue spots would have to be much further away from the green one.


Film or CCD
Aperture (narrow)
Apparent diameter of blue 'circle of confusion'
Apparent diameter of red 'circle of confusion'
Lens

FOCAL LENGTH AND DEPTH OF FIELD

The focal length of your lens, in other words how much you zoom in on your subject, also has a large effect on depth of field. Short focal lengths have much greater depth of field than longer focal lengths. This is one reason why, when taking a portrait shot, it's a good idea to step back a bit and zoom in rather than using a wide-angle lens up close.

In optics, particularly as it relates to film and photography, depth of field (DOF) is the distance between the nearest and farthest objects in a scene that appear acceptably sharp in an image. Although a lens can precisely focus at only one distance at a time, the decrease in sharpness is gradual on each side of the focused distance, so that within the DOF, the unsharpness is imperceptible under normal viewing conditions.

In some cases, it may be desirable to have the entire image sharp, and a large DOF is appropriate. In other cases, a small DOF may be more effective, emphasizing the subject whilst de-emphasising the foreground and background. In cinematography, a large DOF is often called deep focus, and a small DOF is often called shallow focus.

In the examples shown here, at f2.8, the yellow bottle of ink was the point of focus. It is the only object in sharpest focus and the brown and blue bottles either side are completely out of focus.

At f5.6 the area of acceptable focus has increased so that the brown and blue bottles are starting to come into focus.

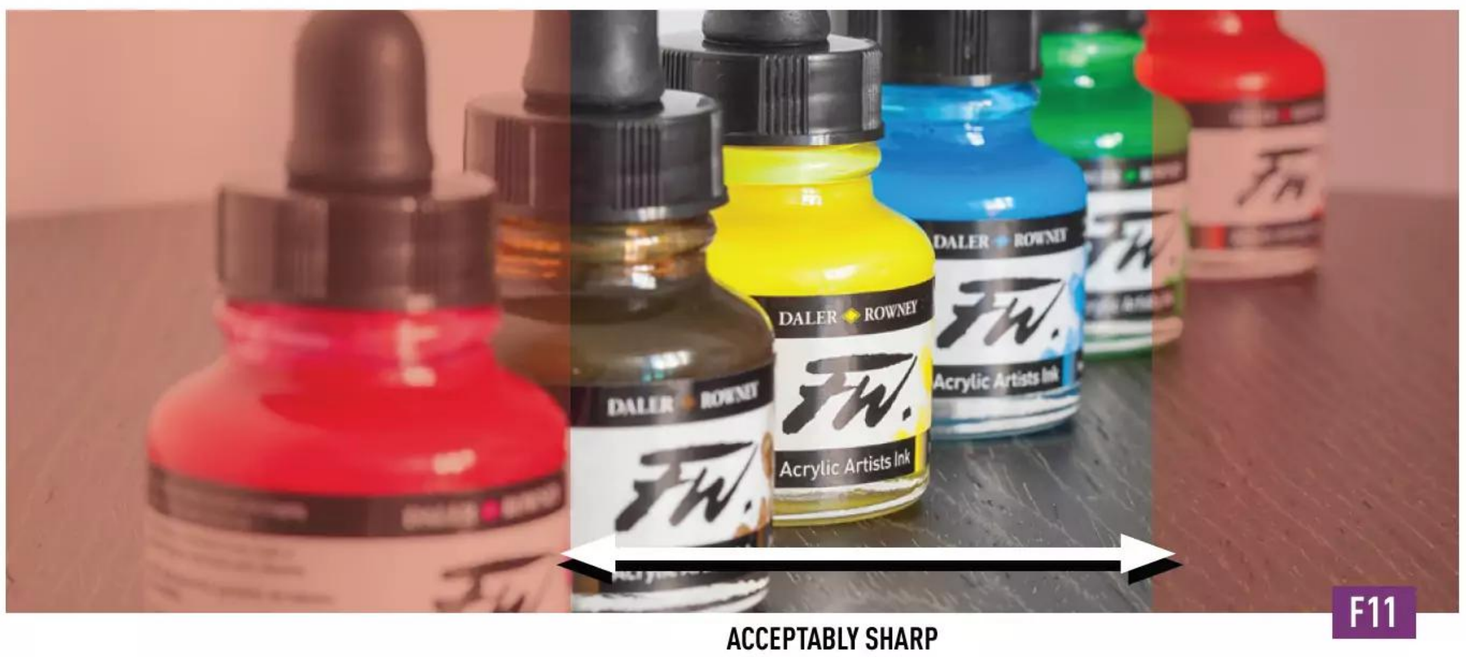
Shooting at f1 brings the brown and blue bottles into sharper focus and the green is less blurred than before.

Stopping the camera down to its narrowest aperture of f32 has all bottles looking reasonably sharp, apart from the red bottle at each end. If you were able to stop this lens down even more, all the bottles would eventually be in focus.

"In optics, particularly as it relates to film and photography, depth of field (DOF) is the distance between the nearest and farthest objects in a scene that appear acceptably sharp in an image."

ACCEPTABLY SHARP

ACCEPTABLY SHARP

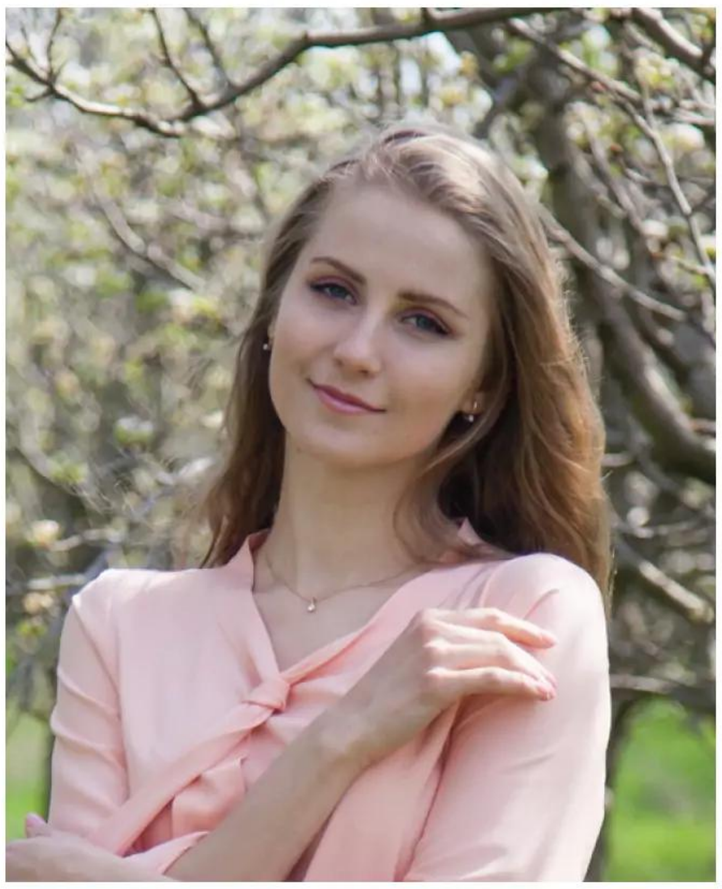


ACCEPTABLY SHARP

ACCEPTABLY SHARP

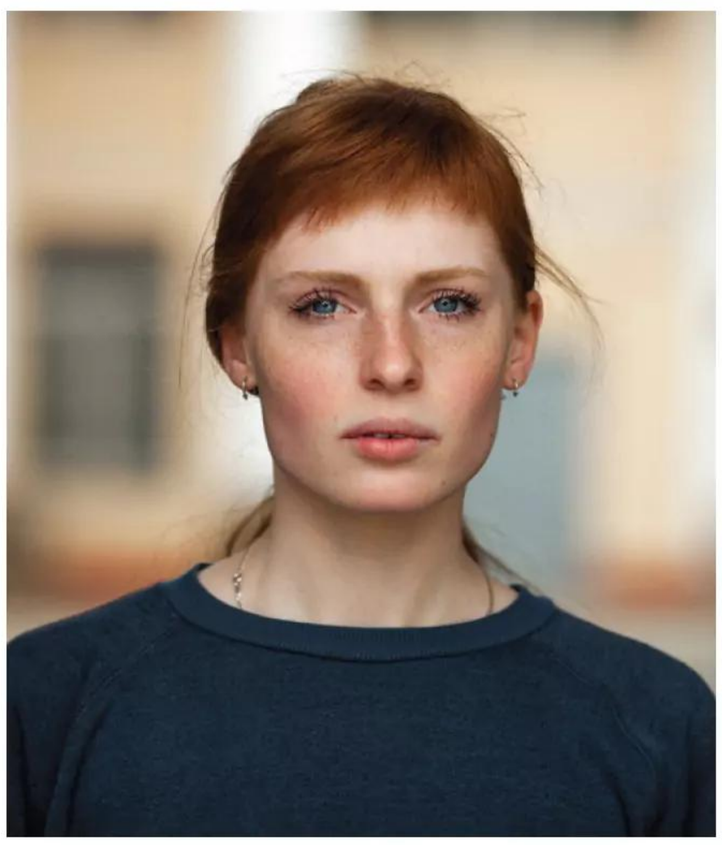
Practical uses for depth of field

There are several situations where controlling depth of field is important. The most common is portrait photography. Subjects shot on an automatic camera using a medium aperture usually have a lot of sharp foreground and background detail, which can distract attention away from the main subject.



As you can see in this example, which has a large depth of field, the subject is in focus, but so is the background, which draws the viewer's attention away from the subject.

By using a wider aperture, and moving the subject further from the background, only the subject is now in sharp focus. A blurred background is much less distracting, and concentrates your attention on the subject, making the subject really stand out from the background.



LANDSCAPE PHOTOGRAPHY

Another situation in which depth of field is an important issue is landscape photography. Here it is often important to maximise depth of field, so it is usual to use the smallest possible aperture. This shot was taken using an aperture of f/16, to ensure that both the foreground and distant background are in focus. It also uses something called Hyperfocal Distance, which involves a bit of maths to calculate.

"Apart from camera shake, bad exposure probably ruins more photos than any other single cause. The main problem is over reliance on automatic metering."

Controlling the light

Accurate exposure in challenging outdoor lighting conditions is the key to good photos

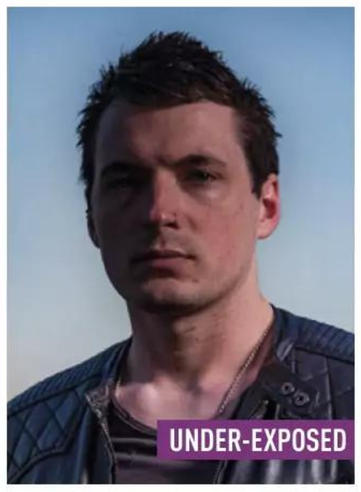
Understanding exposure and how it affects your photographs is probably the single most important technical skill you can learn in photography. It's certainly the one that most people get wrong, and apart from camera shake, bad exposure probably ruins more photos than any other single cause. The main problem is over reliance on automatic metering.

Most modern cameras, even relatively cheap compacts, have sophisticated built-in TTL multi-zone evaluative exposure meters that measure light levels at dozens, in some cases hundreds, of points within the frame, instantly comparing the results with a built-in library of exposure situations and automatically adjusting the shutter speed and aperture to deal with problems such as back-lighting, close-ups or moving subjects.

In most cases these automatic exposure systems are very good, and can reliably cope with most common circumstances. However even the best automatic meter can be fooled, resulting in poorly exposed photos. By overriding the camera's automatic settings and adjusting exposure manually we can avoid these problems and take much better photos.

Let's take a look at a couple of examples. In this first scene we have a portrait of a brightly lit fair skinned model shot against a dark background. This was taken using a typical DSLR camera set on automatic exposure. As you can see the camera has badly over-exposed our model's face, losing details in the highlight areas.

In this second example the same camera has been used to photograph the model, but this time standing in front of a brightly lit background. In this case the camera's automatic exposure system has seriously under-exposed the shot, leaving the model's face in deep shadow with little detail visible.



The same usually reliable exposure meter took both of these shots, so what went wrong? In order to understand what happened and accurately correct it, it is necessary to know how light meters operate, and the rules by which exposure is calculated.

FIG 1. ORIGINAL SCENE

FIG 2. THE LIGHT METER WILL AVERAGE THE SCENE

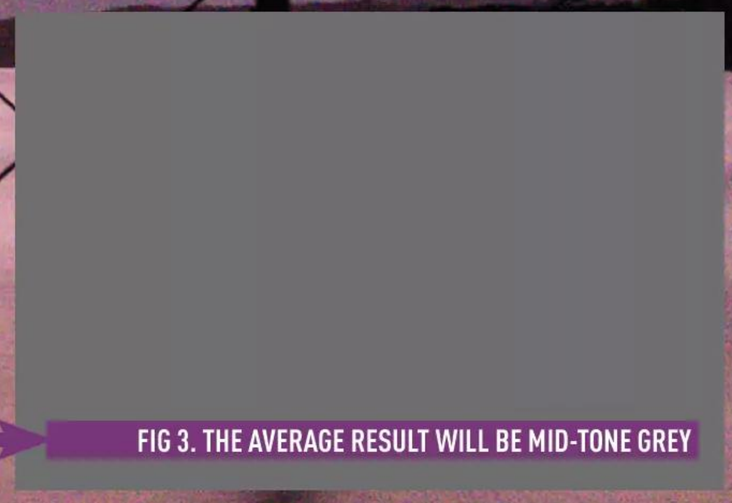


FIG 3. THE AVERAGE RESULT WILL BE MID-TONE GREY

SMALL APERTURE

LARGE APERTURE

Fade to grey

Take a look at the main picture above. What you see there is a photograph of a seaside pier taken in early sunrise conditions, with a good tonal range, plenty of colour and some nice crisp light. What your camera's light meter sees is very different as our example above shows. Try it out for yourself. Find any nice, average snapshot scene, properly lit and with good contrast like our example **FIG 1**. Start up your image editing software and open your picture. Light meters only see in black and white, so reduce the saturation of the shot to zero. Your light meter doesn't see detail, so set your Gaussian blur filter **FIG 2** to maximum diameter and apply it a couple of times. Use the eyedropper tool to measure the RGB colour value of the resulting tone. You should find that it averages out to a mid-tone grey **FIG 3** with an RGB value of around 127,127,127.

It's an interesting and curious fact that any average scene reflects 18% of the light falling on it. Look out of your window, and unless you live in Antarctica the scene you see is reflecting exactly the same amount of light as the scene out of my window. That 18% reflection is exactly the same as a mid-tone grey, midway between black and white.

Light meters are calibrated with this fact in mind. When your camera takes a light reading, the meter averages the scene and adjusts the exposure to produce that mid-tone grey (or 12% luminance, but that's another discussion altogether). If you point the camera at a black stage curtain, it will try to make the black into a mid-tone grey, so it will over-expose. If you point it at snow it will try to make the white into grey, so it will under-expose.

Adjusting exposure

Let's take a moment to explain how exposure is controlled, and what is meant by some of the terminology. If you already know the basics, feel free to skip to the next page.

On all cameras, exposure is adjusted by altering two settings; aperture and shutter speed. Between them they control the amount of light that hits the sensor when the shot is taken.

Shutter speed is self-explanatory, it is simply the amount of time that the sensor is exposed to light. This is usually controlled by an electrically operated mechanical shutter in front of the sensor that opens and closes very quickly for a precisely measured period of time, usually in the order of a few hundredths of a second. Obviously a shutter speed twice as long lets in twice as much light, one half as long lets in half as much.

The aperture is literally just a hole through which light passes on its way to the sensor. The diameter of that hole can be adjusted to precisely calibrated sizes. A smaller hole lets in less light, and a larger hole lets in more.

These calibrated aperture sizes, for largely historical reasons, are called stops, or f-stops. An aperture setting one stop larger lets in twice as much light. For reasons that are both historical and mathematical, the standard full-stop aperture settings that you are most likely to encounter go f/1, f/1.4, f/2, f/2.8, f/4, f/5.6, f/8, f/11, f/16 and f/22. The smaller numbers refer to larger apertures, and the larger numbers to smaller ones. Many cameras can set apertures in increments of 1/3rd of a stop, but the whole-stop numbers are the ones to remember.

Let's consider an example. With your camera set to automatic exposure point it at a scene and take a light reading. For the sake of argument, say the light meter sets an aperture of f/8 and 1/200th of a second. You can produce the same exposure by increasing the aperture by one stop to f/5.6 and halving the shutter speed to 1/400th of a second, because this lets the same amount of light through to the sensor. Similarly, reducing the aperture to f/11 and setting the shutter speed to 1/100th of a second will also produce the same exposure.

However by altering one setting without altering the other you will change the exposure. In our example, changing the aperture to f/5.6 but leaving the shutter speed at 1/200th of a second will increase the exposure by one stop, or one exposure value (EV), making the picture brighter. Decreasing the aperture to f/11 will reduce the exposure by one EV, making the picture darker.

Similarly, changing the shutter speed while leaving the aperture alone will also change the exposure. Double the shutter speed to 1/400th at f/8 and you reduce the exposure by one stop, halve the speed to 1/100th and you increase the exposure by one stop.

The Zone System

In 1939-40 the pioneering photographers Ansel Adams and Fred Archer developed an exposure system based on this fact, a system that is still used today. It is called the Zone System, and is quite possibly the most useful piece of photographic knowledge you'll ever learn. There are several variations on the original system, but I'll go with the one that is easiest to understand.

Starting with 18% grey as the mid-point, the system divides all the tones between black and white into 11 zones, numbered 0-10. Zone 0 is featureless black with no details visible, which in your image editor would have an RGB value of 0,0,0. Zone 10 is pure white with no details visible, and an RGB value of 255,255,255. The mid-tone 18% grey is zone 5, and should have an RGB value of about 127,127,127.

The zones represent exposure values, or EV. The difference between one zone and the next is equivalent to the difference between one exposure setting and another that is one stop higher or lower.

> **"The difference between one zone and the next is equivalent to the difference between one exposure setting and another that is one stop higher or lower."**

PUTTING IT ALL TOGETHER

If we relate the tone scale of the Zone System scale to real world objects we can use it to help produce accurately exposed photos. The zones are roughly equivalent to the following scene elements (adapted from Adams' descriptions):

Zone 0	Pure black, no details or texture visible.
Zone 1	Black tone but no texture. This is normally as black as you want to get in a picture.
Zone 2	First hint of texture and detail, very deep shadow.
Zone 3	Dark materials, details visible.
Zone 4	Dark foliage. Dark stone. Landscape shadow. Shadow on portraits in sunlight.
Zone 5	Clear north sky. Dark skin. Grey stone. Weathered wood. 18% mid grey.
Zone 6	Average Caucasian skin value. Light stone. Shadows in sunlit snow.
Zone 7	Very light skin. Light grey objects. Snow with side lighting.
Zone 8	White with texture. Snow in shade. Highlights on Caucasian skin.
Zone 9	Glaring white surfaces. Snow in flat sunlight. White without texture.
Zone 10	Light sources, reflections of sunlight on metal. Pure white.

Let's go back to the two troublesome portraits from the first page. If we use the spot meter to take a reading from the subject's face, we know that the light meter will give a reading that would make the face mid-tone grey, which is zone 5. However from the zone chart we know that average Caucasian skin should be zone 6, so we need to increase the spot metered exposure by one stop, in this case from 1/100th at f/5.6 to 1/100th at f/4. In the resulting shot the background details start to burn out, but the subject is correctly exposed.

For the over-exposed portrait against the dark background, we can use a similar approach. Spot metering the background gives an exposure setting of 1/3rd sec at f/5.6 to render it as zone 5 mid-grey. By reducing that exposure by four stops to 1/3rd at f/22 we can make the background come out as what it should be, zone 2 texture and detail, leaving the man's face also correctly exposed.

The zone exposure system can help with difficult exposures, but it is helpful in another way. Learning to think of images in terms of tone and dynamic range will encourage you to approach these concepts in a creative way, and to use them to produce better pictures. Controlling exposure is the primary creative tool of the photographer, and learning how to use it will make the difference between mere snapshots and artistic photographs.

This system has been used by professional photographers for over 70 years. Used properly, it can help to improve your photography immensely, probably more than any other single technique.

> "The zone system can help with difficult exposures. Learning to think of images in terms of tone and dynamic range will encourage you to approach these concepts creatively."

Keep an eye on white balance

Outdoor colour balance can sometimes be a challenge

DAYLIGHT, WITH DAYLIGHT WHITE BALANCE

DAYLIGHT, WITH CLOUDY WHITE BALANCE

DAYLIGHT, WITH DAYLIGHT WHITE BALANCE

DAYLIGHT, INCANDESCENT WHITE BALANCE

If you look at a white snow-covered scene, your brain takes over and manipulates what you see, so that it matches your expectation of what white should look like. So, what you see, even under differing lighting conditions, is white. If you put a camera in the same scene, it does not make any such adjustments and adapt to a certain expectation. The camera will simply record the colours that are present in the scene.

'White' light visible to humans can actually vary in colour from reddish orange to greenish-blue. This variation is usually described as a temperature range, with warm being the red end and cold at the blue end, and is usually measured in degrees Kelvin using a colour meter. Confusingly, the higher the colour temperature, the cooler the tone and vice versa.

We perceive various shades of white light illuminating a scene as neutral, a clever trick performed by our brains to maintain a sense of normality. Digital cameras can perform the same trick using a feature called automatic white balance. The camera evaluates the scene through the lens, analysing areas it guesses should be white (highlights) and black (shadows). More expensive cameras have a more reliable ambient white balance sensor that measures the temperature of general, focused light. However these automatic systems can be fooled, so most cameras give you the option of setting the white balance manually, either from presets that cover most normal lighting conditions or by making an accurate measurement of the prevailing lighting conditions.

In the example pictures on this page you can see an image taken outdoors on a bright cloudy day. As you can see, when the camera is set to the daylight setting that suits this lighting, the light areas of the scene are neutral. The same scene looks very different when the camera's white balance is set to cloudy colour temperature. Now there is a distinct reddish-orange cast.

Another example is a typical noon day outdoor scene where the ambient white light temperature is cool. When the camera's white balance setting matches the cool tone of the brightness of the sun, everything looks quite normal. On the other hand,

if the camera has been set for incandescent light, the scene appears to have a very blue cast. Sunlight can vary quite considerably in colour temperature. Early morning and late afternoon daylight is warmer as cooler components of the light are filtered out because it has to shine through more atmosphere and its pollutants as the sun is nearer the horizon. Meanwhile, cloudy and overcast conditions deliver a cooler light because warmer components are filtered out by the cloud.

Our third example is lit with flash lighting on an overcast evening around dusk. With the camera set for flash white balance, the skin tones of the subjects are quite natural looking. However, if you set the camera to fluorescent white balance, then the image is overpowered with a blue cast.

Know your camera

Nearly all digital cameras offer white balance adjustments accessible either from a settings menu or, typically on higher spec cameras, via an external button in conjunction with an LCD display.

Manual white balance

Some cameras can let you calibrate the white balance setting manually. You simply hold a white card in front of the camera lens and press a white balance calibration button. The camera adjusts its white balance setting until the card is reproduced neutrally. Beware of this setting remaining on as when you return to normal shooting conditions it may spoil your pictures!

Preset white balance

All digital cameras offer choice of white balance presets, and some cameras let you choose the setting via colour temperature values. Some really advanced cameras let you bracket white balance settings, or take a series of shots with settings above and below your standard setting. ■

> "We perceive various shades of white light illuminating a scene as neutral, a trick performed by our brains to maintain a sense of normality."

TYPICAL WHITE BALANCE VALUES

BLUE SKY - 10,000

SHADE, BLUE SKY - 7,500

SHADE, PARTLY CLOUDY - 7000

SHADE, DAYLIGHT

OVERCAST SKY - 6000

AVERAGE NOON DAYLIGHT - 5,500

EARLY AFTERNOON SUNLIGHT - 5,000

MID AFTERNOON SUNLIGHT - 4,500

EARLY MORNING/ EVENING SUNLIGHT - 3,500

LIGHTBULB - 3,000

SUNRISE/SUNSET - 2,500

CANDLE FLAME - 1,800

Landscapes and hyperfocal distance

How to make your outdoor shots as sharp as they can be

Landscape photography is one of those genres where sharpness is everything. Wide angle shots of amazing vistas usually require front to back sharpness in your scene to maintain all the detail that was present. The viewer of the final photograph will appreciate the image more if their eye is able to take in all that detail. It will make the photograph 'live' for them. Nothing ruins a shot more than the image being fuzzy and blurry when you need it to be tack sharp. The problem however, is that in many cases in landscape photography you have a foreground element as well as a distant object that you want to be in as sharp focus as possible at the same time. Shooting with a wide angle lens and setting a very narrow aperture of f/22 or even f/32 will yield greater depth of field but you will also run into the optical phenomenon known as diffraction, which is a softening of the image due to the bending of light rays as is passes through the narrow aperture of your lens. This means you will normally be operating around the f8 - f/16 mark when setting aperture. You may find that the depth of field provided at these apertures is not enough to render everything you need in sharp focus.

This is where the hyperfocal distance comes into play. When you focus on an object, technically speaking, only that point of focus is sharp. Beyond that focus point, extending both in front of and behind, is a plane of focus running parallel to the camera sensor. This area is known as the depth of field and it is this region that is deemed to contain an area of acceptable sharpness. They key to hyperfocal distance is knowing the closest distance at which a lens can be focused while keeping objects at infinity as acceptably sharp as possible. Everything from half the hyperfocal distance out to infinity will be in focus.

A very basic rule of thumb is to compose your scene and then focus roughly one third of the distance into the scene. This can be quick and reasonably helpful, particularly where your scene has excluded the horizon or near foreground, but rarely is it optimal to get the best out of the depth of field. You could use your camera's live view function to visually set focus on the most distant object in your scene and then slowly adjust the focus closer whilst keeping an acceptably sharp background. Finally of course, there is the mathematical way to calculate the exact point. There is a bit of assumed knowledge when using the mathematical formula. You will need to provide the focal length of the lens you are using, the Circle of Confusion value for a given sensor size, which is the largest blurred spot that the human eye can detect (usually a value of around 0.03 - 0.02) and the f-stop you are using. If you have a calculator you can do the following:

$$H = \frac{f^2}{Nc}$$

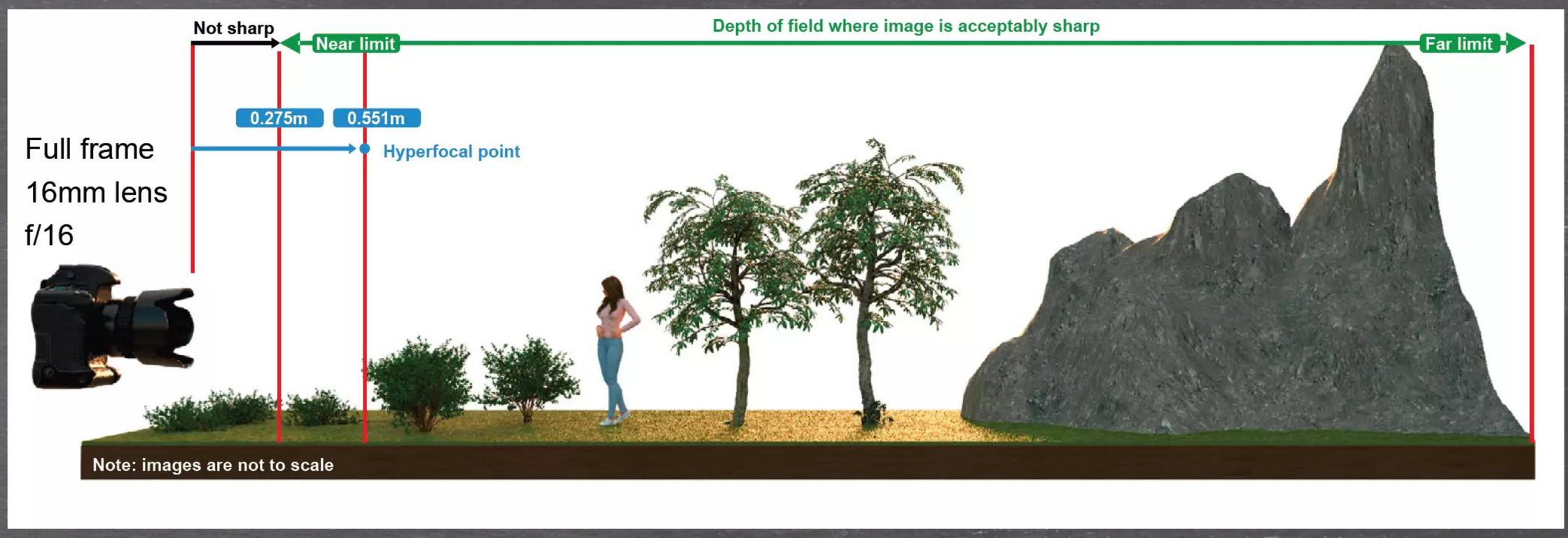
H = Hyperfocal distance
f^2 = focal length x focal length
N = Aperture number (f-stop)
c = Circle of confusion

The result, in millimetres, will be the distance at which you need to focus to attain greatest depth of field. Thankfully there are plenty of on-line calculators and apps for your phone that can do all the heavy lifting for you. Just so we can say we understand the theory, let's try out a couple of examples as shown here. We're using a full frame camera with a Circle of Confusion value of .029 as an average on a 16mm lens and a 50mm lens. Both are set at an aperture of f/16. ■

Example 1 - 16mm lens @ f/16

$$H = \frac{16mm \times 16mm}{f/16 \times 0.029} = 551mm\ (0.551m)$$

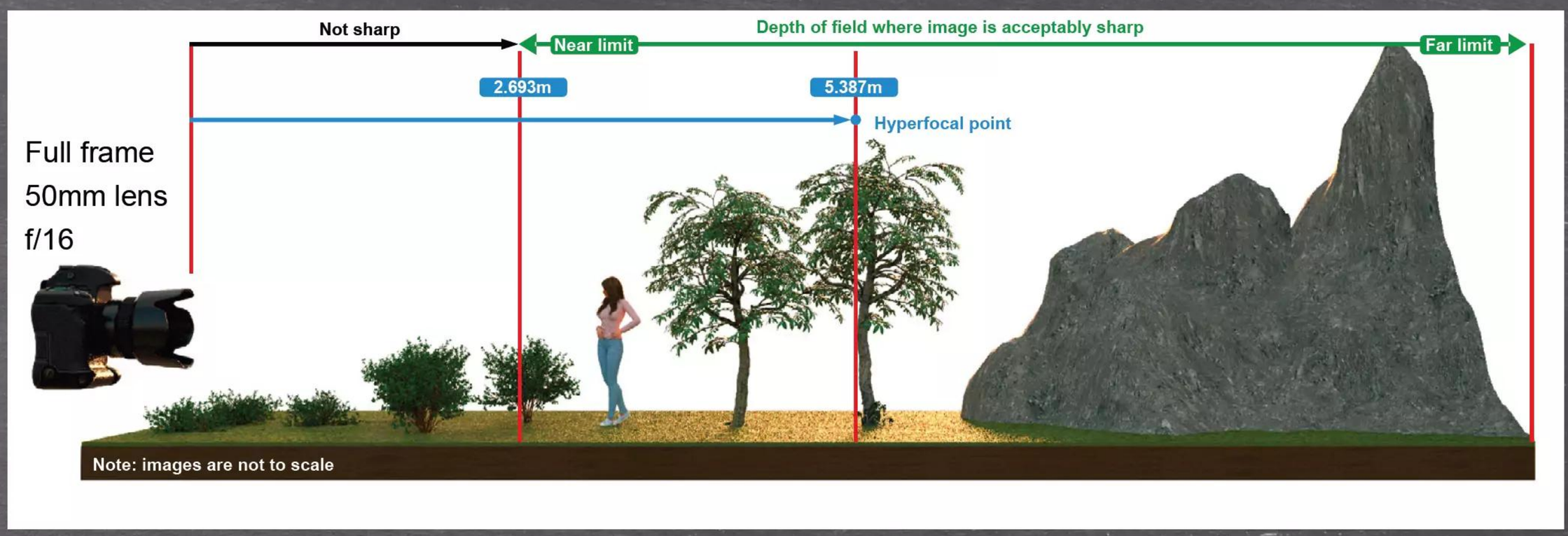
The near limit of acceptable sharpness is half of the hyperfocal value, stretching out to infinity.



Example 2 - 50mm lens @ f/16

$$H = \frac{50mm \times 50mm}{f/16 \times 0.029} = 5387mm\ (5.387m)$$

The near limit of acceptable sharpness is half of the hyperfocal value, stretching out to infinity.



The rules of composition

Make a good picture great with some simple tips

The addition of elements in a scene can make or break a photograph. If you cover up the bench in the lower left of the shot with your thumb, does the shot seem unbalanced and incomplete without it?

The main difference between a well taken snapshot and a truly artistic photograph is simply a matter of composition. By changing the focal length, the angle and the position of the camera, the photographer can change the relative positions and sizes of objects in the frame to produce a more visually pleasing effect. Learning to do this is mostly a matter of practice and experimentation, but there are a number of simple tips and rules-of-thumb that can help you to take better pictures.

The first and most important thing to remember is to take your time. Look at the scene in the viewfinder or on your monitor and try to see it not as simply a view but instead to imagine it as a finished print. Ask yourself if there's any way that it can be improved by maybe zooming in a little, or by moving the camera. A tripod is a very useful tool for this, since it lets you view a completely static image without the need to hold the camera steady.

The Rule of Thirds

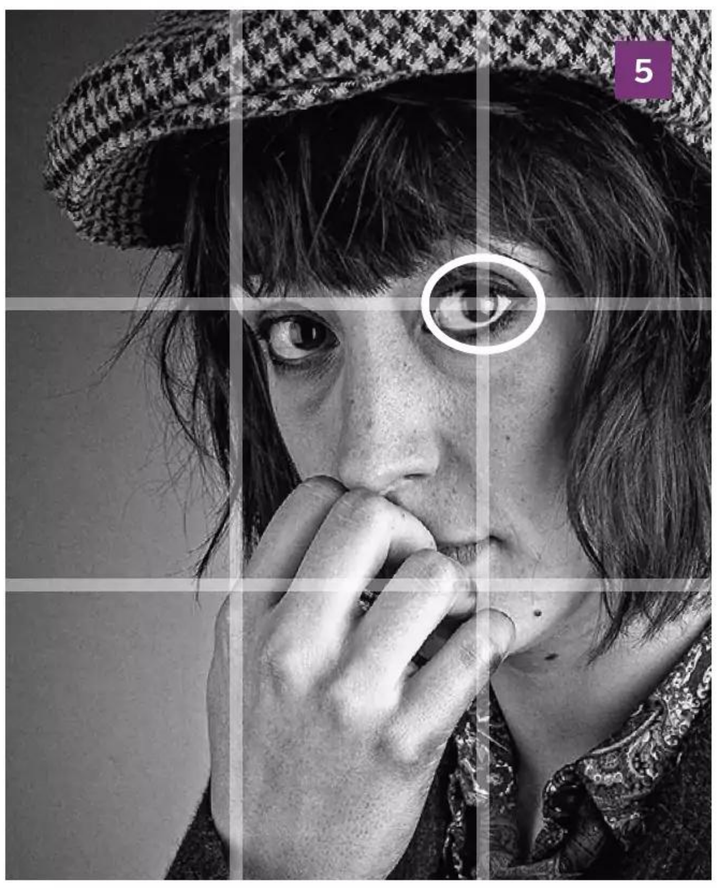
The most commonly used compositional technique is called the Rule of Thirds, and it's really very simple. Let's take a look at an example landscape picture **[1]**. It's a nice enough shot, correctly exposed, in focus and nicely lit, but now look at the next example **[2]**. Doesn't that feel better? It's obviously the same scene, and taken from roughly the same position, but this composition is much more appealing. The reason it works is because the tree is now positioned off-centre in the frame, in fact it is one third of the distance from the right to the left. This type of composition is known as the Rule of Thirds.

The best way to apply the Rule of Thirds is to imagine the frame divided up into thirds both vertically and horizontally, rather like a Noughts and Crosses (Tic Tac Toe for those in the USA) grid **[3]**. If you position the main elements of the image on these imaginary lines, or better yet on the intersections where the lines meet, you'll find that your image will look a lot more pleasing to the eye.

The Rule of Thirds works just as well in vertical-format shots, and is useful in landscape photography, since features on the horizon makes a natural dividing line **[4]**.

Portraits can also benefit from Rule of Thirds composition. By positioning a subject's eye at a point where the imaginary lines intersect **[5]**, will give your portrait balance and really help to draw the viewer's attention into the picture.

Most digital cameras feature an option to superimpose the Rule of Thirds grid on the monitor screen to make this type of composition easier. Now you know why it is there. ■



"Look at the scene in the viewfinder or on your monitor and try to see it not as simply a view but instead to imagine it as a finished print."

OUTDOOR PHOTOGRAPHY HINTS & TIPS

Some handy quick reference tips to start you off

50 Cleaning - Batteries - Cold conditions

51 Bright beach scenes - Leading lines - Rule of thirds

52 Exposure compensation - Animals - Concerts

53 Cars - Close-up - Sports and action

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> "So you have a new camera, or you are itching to get one and get out there and start snapping away, filling memory card after memory card, right?"

For many people, new to the world of photography, one of the easiest and most accessible areas first explored with a new camera is the great outdoors, and why not? You don't need a studio or masses of expensive equipment. There is plenty of available light, unless you're feeling adventurous and want to try night photography, and beautiful seaside or countryside scenes are usually not too far away by car or a brisk walk.

Photographing outdoors is an amazing and rewarding experience for the novice and seasoned professional. Whether it's just a record of a day trip you've made to a new location with the family or a more serious professional endeavour in an exotic landscape, your shots, when taken well, are able to instil all sorts of emotions in the viewer of the final shot. Even if it is that most mundane of emotions summed up in the simplest way: 'wish you were here'.

So you have a new camera or you are itching to get one and get out there and start snapping away, filling memory card after memory card, right? Before you do, why not take a quick look at our essential hints and tips. Then, over the following pages we have assembled a useful quick reference guide to outdoor photography that can take your photographs to the next level. Go from 'snap' to 'masterpiece'. The rest of this publication will also cover some of the tips in greater detail, so turn to the next page and start reading. ■

1

Cleaning

Like any piece of complex equipment, your camera needs regular care and maintenance if it's going to continue to work properly. Dust and dirt can cause serious problems, so clean your camera regularly. Clean the outside with a soft cloth and use a small soft brush to get into the nooks and crannies. Clean your lens carefully, using only a proper lint-free lens cloth and lens cleaning fluid, which should be applied to the cloth and not to the lens directly.

2

Batteries

Your digital camera can't operate without power, so make sure you fully charge the battery before taking it out for the day. If you're going away for a holiday remember to take your battery charger and an adaptor for foreign mains sockets; and maybe consider investing in a spare battery or external battery pack in case you can't charge it for a while. There are also several devices available that can charge your battery using solar energy or from a hand cranked mini-generator.

3

Cold conditions

Cold conditions can cause a few problems for your digital camera, the main one being its effect on batteries. You'll find that even on a cold morning after a clear summer night, your battery will only last around half as long, so keep a spare in a warm inside pocket and swap them over when the first runs out. When you take your camera back indoors, keep it in a sealed plastic bag until it's warmed up, to avoid condensation problems.

4

Bright beach scenes

Shooting bright beach scenes can be tricky with an automatic camera. The exposure meter will try to make that expanse of pristine white sand look like a mid-tone grey, which will cause anything else in the scene to be under-exposed. Use your camera's exposure compensation, or manual exposure if your camera has it, to increase exposure by two or three stops to counteract the metered under-exposure. Alternatively, use spot metering on your subject's face to produce a more accurate result.

5

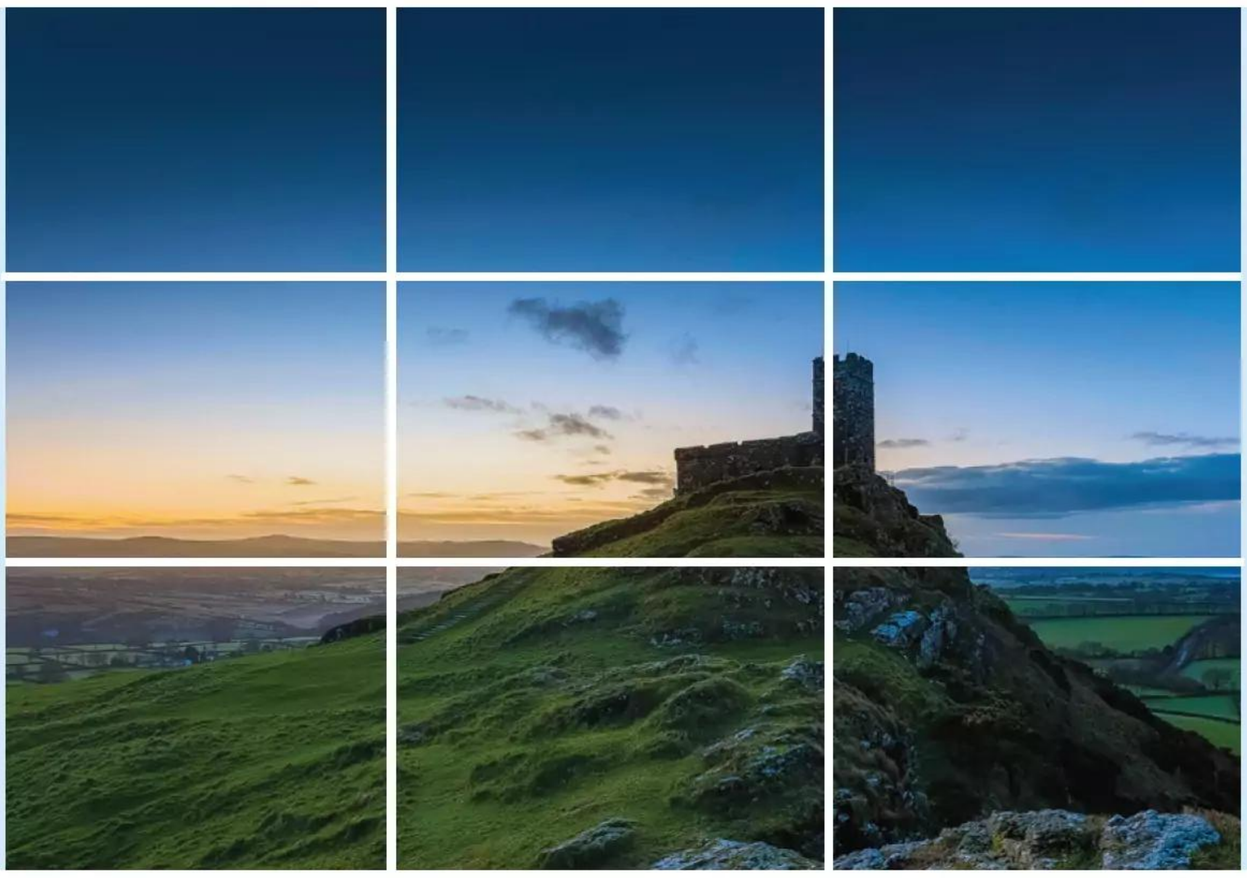
Leading lines

There are many rules and guidelines for photographic composition but one that applies most often to landscape photography is the concept of leading lines. When composing your shot, try to find lines in the scene, such as roads, rivers, railway lines or hedges. Frame your shot so that these lines will lead the viewer's eye into and through the scene. They will also help to give the scene a sense of scale and perspective and this will also help with your composition.

6

Rule of thirds

One of the most commonly quoted rules of photographic composition is the famous Rule of Thirds. When composing the scene in the viewfinder, try to position the main elements of the scene in such a way that they fall on imaginary lines a third of the way across the frame, either vertically or horizontally, or even both. This technique works for all kinds of photography, not just landscapes.



7

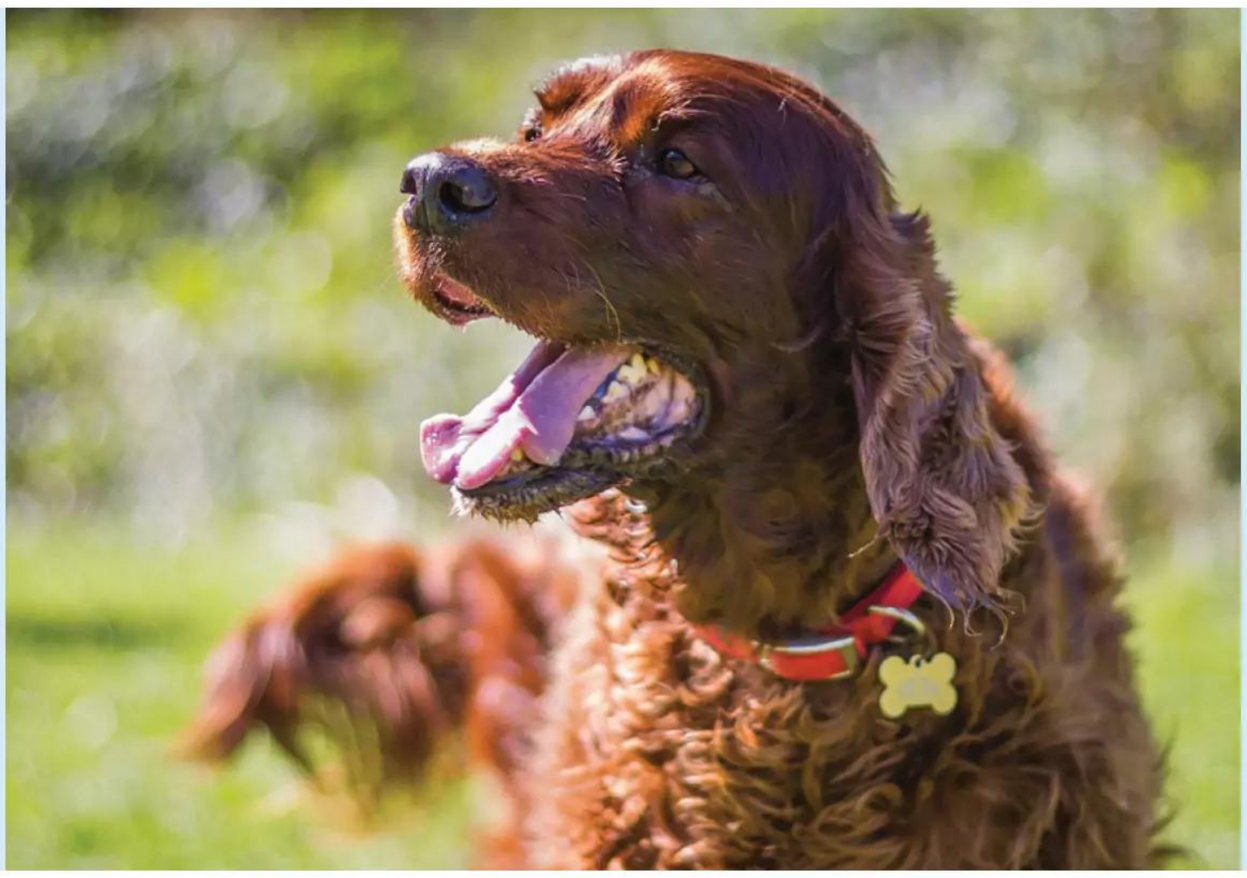
Exposure compensation

Your camera's exposure meter will usually try to make everything in the frame appear to be of average brightness, which can cause problems if there are areas of very deep shadow or bright light sources in the scene you're trying to photograph. Use exposure compensation to overcome this. To make sure that shadows remain black, reduce exposure by a couple of stops. Stop bright highlights under-exposing the scene by increasing exposure accordingly.

8

Animals

The old actors' adage "never work with children or animals" can also apply to photographers. Even domesticated animals and pets will seldom co-operate and pose for a photo; and wild animals will usually run or fly away as soon as they see you, so you have to employ some special tactics. For pet portraits try giving the pet a chew toy or a catnip treat to get them to sit still and with wild animals follow the professionals and use camouflage and a long telephoto lens to help you get closer.



9

Concerts

Outdoor music festivals and concerts are a popular summer activity in many countries and often make excellent photo opportunities. If you have the equipment, shooting from a tripod at the back of the audience using a fast telephoto lens gives excellent results but for more modest cameras you'll need to get closer. When shooting concerts at night, try setting your exposure manually to 1/20th of a second at maximum aperture and use an ISO setting of 1600. If possible, focus manually too.

10

Cars

A quick browse through any popular car magazine will show you that there are a couple of standard ways to photograph cars. The most commonly used technique is to park the car somewhere interesting, like an abandoned warehouse or deserted beach, preferably just after dawn or just before sunset, use a wide-angle lens and shoot at a low angle from the front quarter of the car with the front wheel turned away from you to show off the alloy rims. It may be a cliché but it works.

11

Close-up

Good close-up photography requires either a camera with a very close minimum focusing distance or a special macro lens. The main problem with extreme macro photography is that the object you're focusing on will be in the shadow of your camera, so try to arrange lighting from the side. One handy gadget to try if you plan to do a lot of close-up work is a ring flash, which provides even illumination from all sides.

12

Sports and action

The summer is a good time to photograph sports and other outdoor activities. For spectator sports you'll need a fast telephoto lens, such as Canon's excellent (but very expensive) EF 800mm f5.6 L IS USM. If that's too steep for you, try getting as close to the action as possible and then using your zoom lens at maximum length and maximum aperture. Time your shots carefully so as to minimise motion blurring. If your camera has a sports mode, use that.

12

Fill-in flash

If you're shooting a portrait into the sun with your subject's face in shadow, use your camera's flash to help balance the sunlight and fill in those dark shadows. Most cameras these days have an automatic fill-flash setting that will work with the exposure meter to produce the correct result but if not use the flash on full power and reduce the aperture by one or two stops to avoid over-exposure.

14

Group portraits

If you're shooting a group portrait outdoors, try to find a location that lets you position your subjects at different heights. A set of broad steps, a low wall, a park bench or even the trunk of a fallen tree make ideal impromptu stages, and add interest to what would otherwise be a fairly dull photo. Position shorter people at the front of the group or get those at the front to kneel, so that everyone can be seen clearly in the shot.

15

Portrait backgrounds

When shooting a portrait outdoors, always be aware of objects in the background and how they will appear in your shot. You can avoid the classic mistake of having a tree appearing to grow out of the top of someone's head by using a wide aperture (narrow depth of field) to blur the background while keeping the subject sharp. If you want a sharp background in your shot, take care to position your subject so as to avoid obtrusive distractions.

16

Time of day

When shooting landscape shots, the time of day is all-important. You can't control the position of the sun in the sky, so you'll have to wait for it to be in the right position to provide the best lighting for your scene. Make a note of sunset and sunrise times and try to visit the same location several times at different times of day. The favourite times for perfect lighting are an hour after sunrise and an hour before sunset, known as the 'golden hour'.

17

Position

Since you can't move the landscape around to suit your composition, choosing the right position to take your shot is all-important. Study the scene you want to capture and try to picture how it would look from higher up, lower down or from a different angle. Be aware of obstructions such as power lines and pylons, and try to choose a location that minimises their impact. The perfect location may involve a bit of hiking but it will be worth it.

18

Harmony and balance

There's more to a good landscape composition than just a snapshot of some nice hills. Try to include foreground detail such as old walls, rock formations or plants. They will add depth and a sense of perspective and scale to your picture, and make for a much more interesting composition. Try to balance foreground detail with background detail to create a harmonious balance to your composition.

19

Choose the right camera

When you're looking to buy a new camera for outdoor photography, make a list of your requirements and set yourself a budget. Don't forget to allow for accessories such as lenses, a tripod and cleaning kit if you need them. Don't fall in to the trap of thinking that a more expensive camera will make you a better photographer. You're much more likely to improve your technique by overcoming the limitations of cheaper kit than by spending more money than you need to.

20

Choose the right lens

If you're buying a compact system camera or DSLR, it will probably come with a standard telephoto lens that is ideal for general photography and snapshots but there is a wide variety of special lenses available for other types of photography. If you like to shoot landscapes, get a good wide-zoom lens but avoid super-wide lenses as these will distort the image. If you want to shoot wildlife, you'll need a high quality fast telephoto but this will be expensive.

21

Buy a tripod

The quickest way to improve your photography is to invest in a decent tripod. For the best combination of strength, rigidity and portability, the ideal choice is carbon fibre. Carbon fibre tripods start at around £120 ($175, €165) and can cost ten times more, so if that's too expensive get a good quality aluminium one. Features to look for include a ratcheted centre column, portrait-format tilt and all-metal construction. Avoid ones with plastic heads, as they are seldom rigid enough to prevent camera shake on long exposures.

22

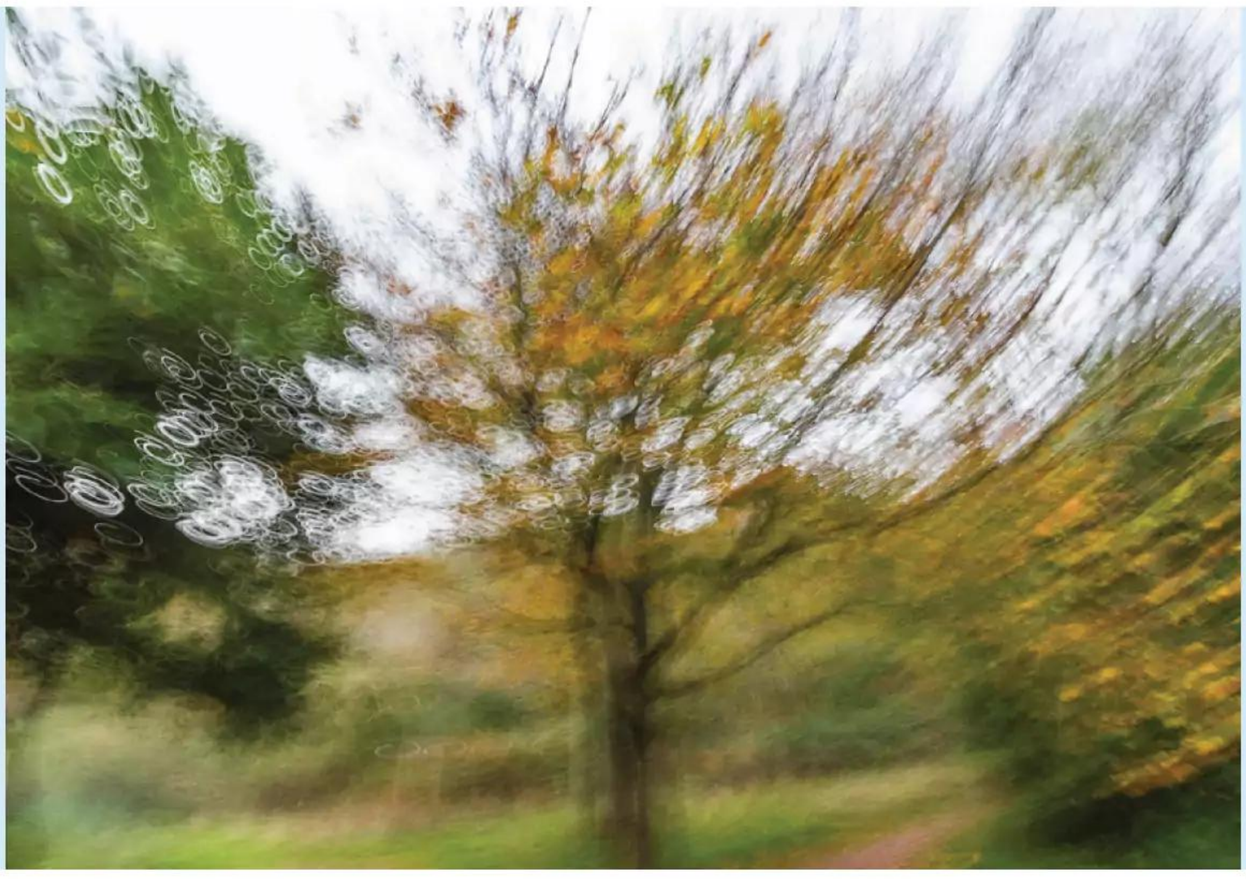
Photo editing software

To get the best out of your photos you'll need photo editing software. You can make simple edits with the Photos app that comes with Windows or with Photos on a Mac but for more accurate and detailed work you'll need something more capable. The best is Adobe Photoshop but with a monthly subscription fee, it may be too expensive for most hobby users. Fortunately there are plenty of cheaper options, including Corel PaintShop Pro X9, Corel AfterShot Pro 3 and Adobe Photoshop Elements 15.

23

Avoid camera shake

Camera shake ruins more photos than any other cause. You can avoid it by setting a faster shutter speed or higher ISO setting, or by using your camera's sport or action mode. Try bracing your camera against a solid object such as a wall or tree for additional support. You can eliminate camera shake altogether by using a tripod or by resting your camera on a solid surface and using the two-second self-timer setting or a remote shutter release.



24

Natural light portrait

Shoot portraits outdoors to take advantage of natural light. Position your subject so that their face is well-lit but don't believe the old tip about having the "sun over your shoulder". You should avoid having them face directly into the sun, because this will cause them to squint. The best option is to have them stand in bright shade, or near a white wall or other object that will reflect a flattering diffused light.

25

Whatever the weather

Remember that the weather is part of the landscape too. While a nice sunny day is perfect for outdoor photography, natural weather effects such as mist, clouds and even rain can be used to create an attractive photo under the right circumstances. Make the weather part of your composition. Try capturing mist in early morning light, or raindrops hitting puddles or the surface of a lake. Cloud formations can add interest to the composition of a panoramic landscape shot.

26

Night photography

You can capture amazing photos of the stars on a clear night by setting your camera on a tripod, setting the aperture to its widest position and using the 'B' exposure setting and a cable release to hold the shutter open for five or six minutes. Make sure you're well away from any light sources such as street lights or passing cars. If you point your camera towards the Pole Star (or the Southern Cross) you'll capture the apparent circular motion of the stars as the Earth rotates.

27

Low-light

When shooting in low light the most important thing to remember is that your camera's exposure meter will try to brighten everything up; this can cause problems with image noise at higher ISO settings. To capture dimly lit subjects against a dark night-time background, try reducing your exposure by a couple of stops. This will also help to reduce the blurring caused by camera shake and moving subjects during long exposures.

28

Focusing

Your photo needs to be properly focused but it's important to make sure that you focus on the right point. For narrow-depth-of-field portraits, try focusing on the subject's eye that is closest to the camera. For big panoramic landscapes using narrow apertures, manually focus on a point roughly one-third of the distance between the foreground and the most distant point. This should ensure that the whole scene looks sharp. If you use autofocus, try using spot focusing, it's usually more accurate.

29

Hot weather

Hot weather can also cause some problems, with condensation and high humidity being at the top of the list. Keep a couple of bags of silica gel in your camera bag to absorb any stray moisture and wipe off any surface condensation as soon as it forms, to avoid it seeping inside your camera and messing up the electronics. Keep your lens clean too and avoid the problem of fungal blooms growing inside the lens barrel.

30

Black and white

There are many subjects that can look great in black and white, particularly portraits, rough textures like old stone, and even landscape shots. However the black and white mode on your camera may not do the scene justice. You can get much more creative control over the final appearance of the image by converting the photo to monochrome using photo editing software. This is especially true if you shoot in Raw mode, with its much greater tonal range.

31

Flash

Many people will try to use their camera's flash when shooting outdoors in low light but using flash outdoors has its own special difficulties. The effective range of your flash will be greatly reduced, since it has no walls or ceiling to bounce off, so make sure your subjects are no more than three or four metres away. If they're outside this range turn the flash off and use the night-portrait mode instead.

32

Raw mode

Most high-end cameras, and even some of the better mobile phone cameras, have a feature called Raw mode. This is the equivalent of the negative in a film camera; you can take the Raw image data and process it yourself using image editing software such as Photoshop.
The advantage is that the Raw mode file contains uncompressed data with more colour information and tonal depth than the processed JPEG image that your camera usually produces, so you can do more with it.

33

Get on their level

Children, as you may have noticed, are usually considerably shorter than adults, so all too often when photographing them they're either looking awkwardly upwards into the camera or you can only see the tops of their heads. When photographing young children, try kneeling or sitting down, so that you're more or less on their level. You'll appear less intimidating and your picture will capture the world from the child's point of view.

34

Adventure photography

If you're keen on outdoor pursuits such as hiking, camping, skiing, kayaking and so on, you'll no doubt want to take photos to record your adventures. Most normal cameras don't take too kindly to being soaked in rain or submerged in a river, so buy yourself one of the many waterproof, shockproof cameras that are available, such as one of the GoPro range of action cameras. If you do want to take your DSLR along, invest in a fully waterproof case such as the Aquapac.

35

Focal length

Focal length, or the zoom setting of your lens, is one of your most important creative tools. Longer focal lengths let you get closer to distant subjects, whilst wide angle settings let you capture more of your surroundings. However, most people only ever seem to use the minimum and maximum settings. If you do this you're missing out on a lot of creative potential. Use focal length creatively to improve composition or to focus attention on details in a scene.

36

Depth of field

Depth of field is the distance between the nearest and most distant objects in a scene that are in focus. It is controlled by a combination of aperture and focal length and is an important creative tool for improving your photographs. Use a narrow depth of field (wide aperture) to isolate subjects against a blurred background or use a large depth of field (narrow aperture) to capture an entire scene in sharp detail.

SHOOTING OUTDOORS

Learn creative techniques and enjoy being outside

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Now you're familiar with how your camera works and how to use its many features, you're ready to start learning the creative techniques that professional photographers use to achieve great results time after time. By learning and using a few simple techniques you can turn your photographs from well-taken snapshots into works of art of which you can be proud.

Professional photographers use some very simple tricks and rules-of-thumb that have been developed over many years, including rules of composition that are inspired by classical art. Combined with technical skill and a thorough understanding of the principles of photography that we laid out in the previous section, these artistic methods produce well-balanced, attractive photographs that will really stand out. However the true artistic inspiration that differentiates a talented photographer from merely a skilled technician must come from within, and can't be taught by any guide book, but we hope you will step out and make your mark.

There are of course many more secrets and tricks in the field of creative photography than we have room to cover in this general guide to photography, but hopefully we can show you some basic principles that will form the foundation of your hobby and inspire you to learn more. If we succeed in that aim, then our job here is done! ■

"By learning and using a few simple techniques you can turn your photographs from well-taken snapshots into works of art of which you can be proud."

Pet photography

Time to get our furry friends ready for their close up

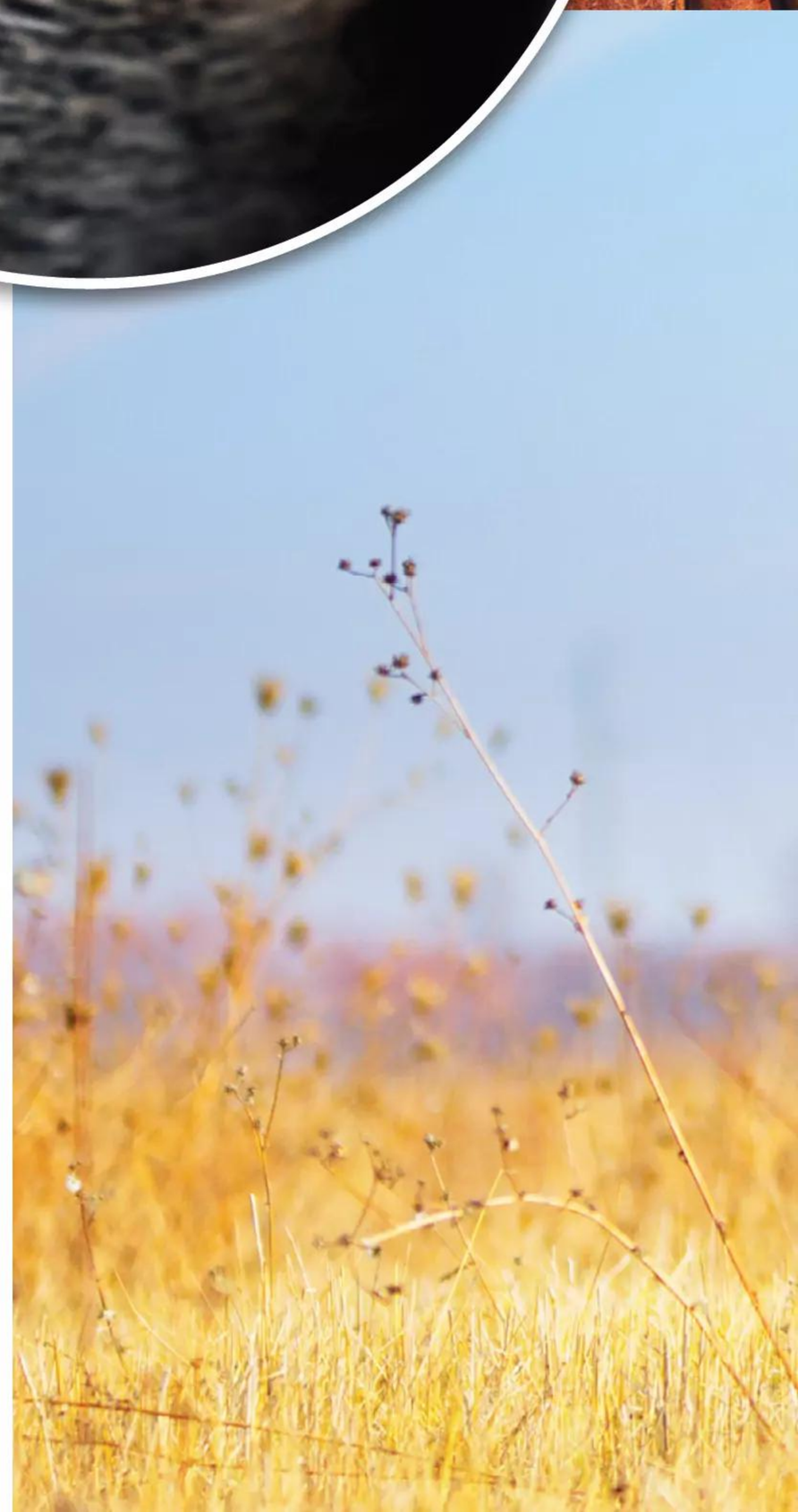
We love our pets. In fact for most people they are more than mere pets and become more like family members, the recipients of love, affection and lavish attention. It is likely then that their owners, at some point, are going to want photographs of their furry friends (or scaly, feathery or otherwise). We have a dog, and the number of photos that include him specifically outnumber those of all other family members put together. However, pet photography presents its own special problems. Animals, as we all know, can be unpredictable, lazy, aggressive, hyperactive and downright cute. If you're thinking of trying pet photography, here are a few pointers to get you started.

Pet personality profile

You don't need to sit the pet in question on a psychiatrist's couch and ask it to tell you about its mother, but before you start snapping away, find out about your subject's personality and habits. Where does it snooze if the sun is out? What is its favourite toy? Is it lazy, sleepy, or does it like to perch on a garden fence or hide in the grass? Take time to chat with the owner and observe your subject to gain some insight. It's also worth spending a little time getting to know the animal yourself. Cats, dogs, horses, they all have personality, and you need to ensure they are comfortable being around you, and you around them. Scaring a pet right at the outset is not going to make for a particularly happy or productive photo shoot.

Close quarters

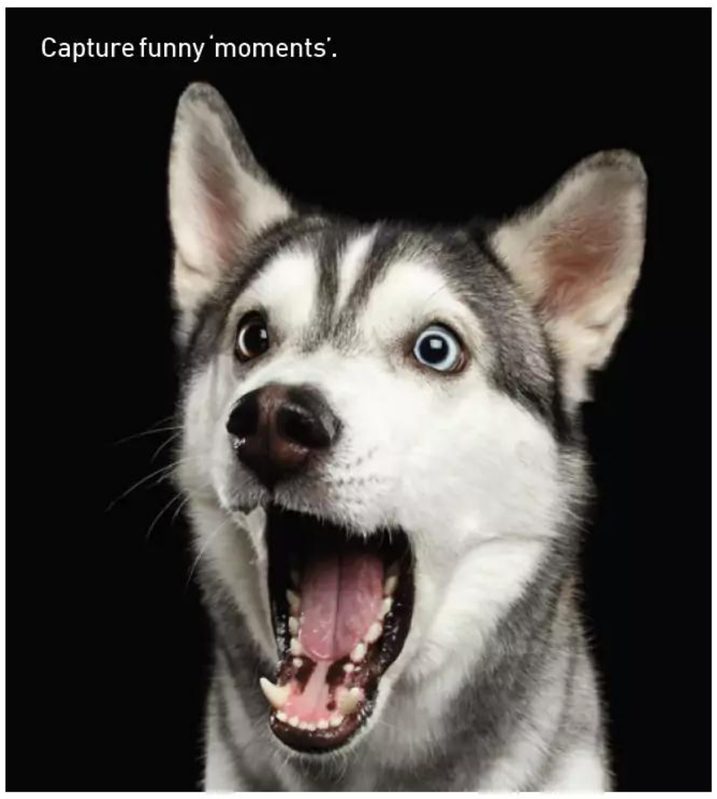
Think about getting in close to your subject. If the pet is comfortable with you, and if it isn't too skittish, fill the frame with the pet's face. Get the eyes nice and sharp. Just like humans, this is a natural point of focus, although focusing on the snout of a dog or cat can also make for an interesting image in its own right. A good portrait focuses on the subject and not the background. Yes, there are times when shooting wide can create a great environmental portrait, but make sure you get a good selection of close-ups. A macro lens is perfect for capturing details of the pet, and shooting with a wide aperture keeps any background distractions out of focus.



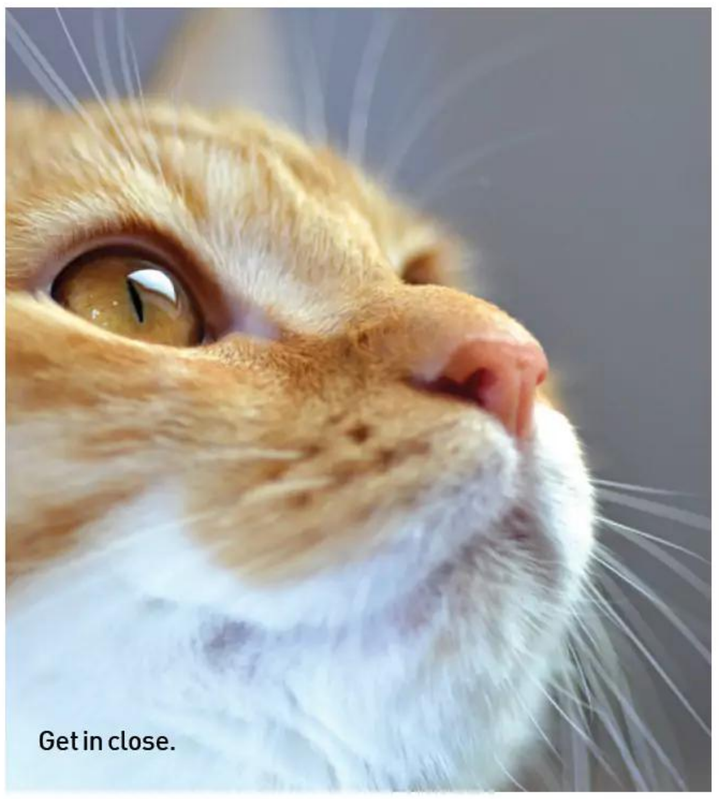
"Get the eyes nice and sharp. Just like humans, this is a natural point of focus."

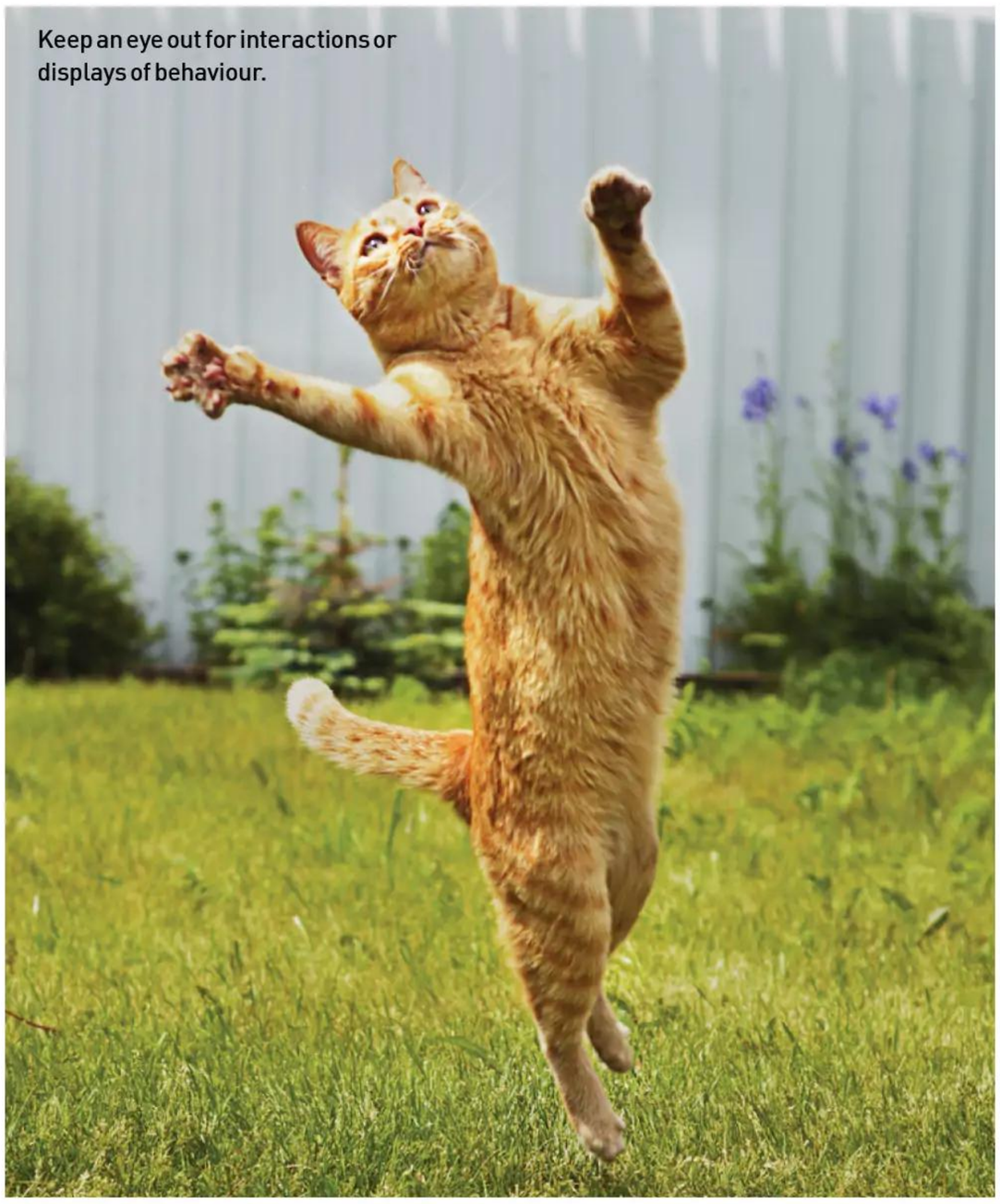
TOP TIP!
Get lots of practice in being able to track and focus on moving subjects. Using your camera's AI Servo intelligent tracking can mean you get more hits than misses.

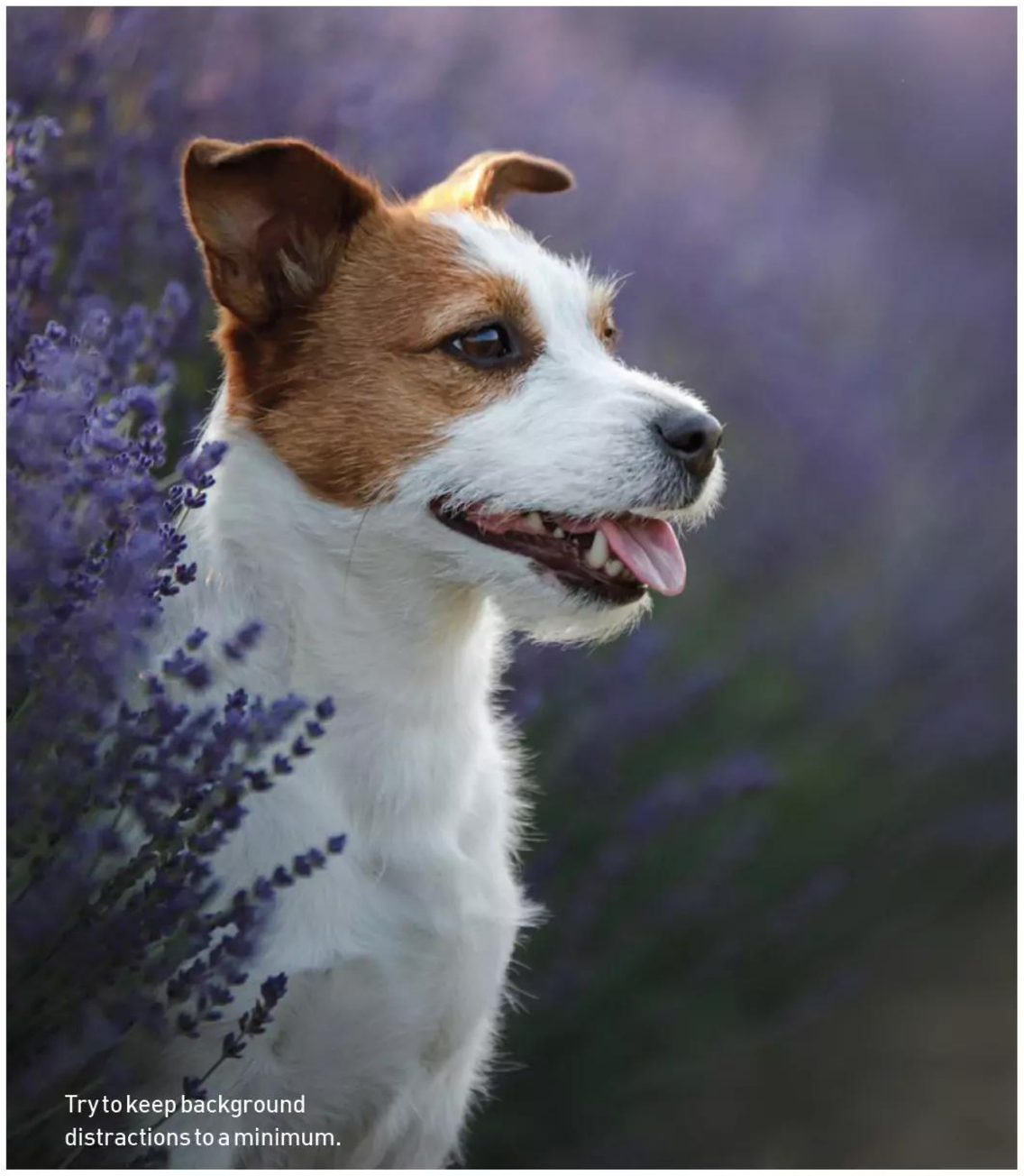
"As they say, "memory is cheap, but memories are priceless". Pets are challenging subjects so you're just going to have to stay sharp and keep shooting."


Capture funny 'moments'.

Keep the eyes nice and sharp.


Get in close.


Keep an eye out for interactions or displays of behaviour.


Try to keep background distractions to a minimum.

Obviously if the animal is not content to keep still for more than a second, this can be a challenge. Keep snapping away; try using your camera's continuous autofocus to track the animal as it moves. If it's proving too difficult, let the animal play a while, and try again. Pets have very short attention spans, so keep it fun, break it up a bit if you have to and always reward and fuss them when they do well.

On the level

Your average dog is a couple of feet tall, cats even smaller. The average adult human is about 5' 7". If you photograph a pet while you're standing up, all you're going to see is the top of their head and their backs, not what you want for a portrait. Get down to their eye level, and see the world from their perspective. If you are able, get lower still. Try pre-focusing your camera and just holding it at ground level so you can look up at the pet. It's worth a try just for a new angle on things.

Lighting

When meeting a new animal, bring a flash and, with the owner's permission, while greeting or playing with the pet, fire a couple of test flashes away from them to see their reaction. In daylight particularly, they never seem to mind the flash at all. If they do mind, then stick with natural light and use a white or silver reflector if you need to fill in any shadow areas. Indoors, a bright continuous light may be preferable. We have a photoflood light that, rather than using old tungsten bulbs, uses three daylight-balanced energy saving bulbs. They are housed in a 22" reflector that you can cover with a diffuser to soften the light if need be. You can also try placing your subject near a window to use the natural light. If we are using flash with a willing subject then we invariably use cross-lighting, avoiding shooting a flash directly at them.

Be patient and carry on!

As they say, "memory is cheap, but memories are priceless". Pets are challenging subjects so you're just going to have to stay sharp and keep shooting. The more you shoot, the greater your chances of hitting that perfect shot!

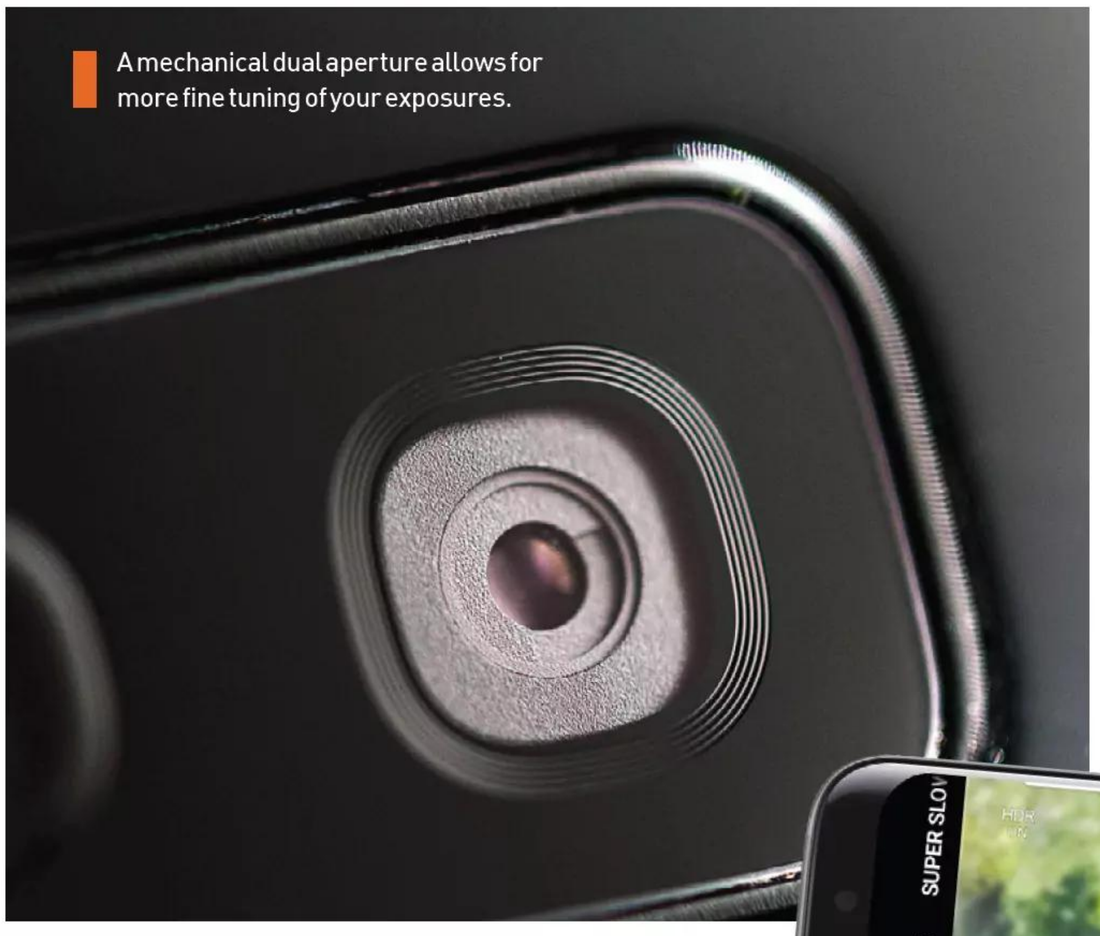
Mobile phone photography

Amazing photos and video from a new camera benchmark

It goes by many names, mobilography, iPhoneography, mobile phone photography, etc. and it cannot be ignored. The mobile phone has now become more than a mere telecommunication device, it has transformed into a smartphone, or as more people refer to it, a camera phone. The boom in sales of smartphones has been huge. At first of course, it was just a mobile telephone but as the technology advanced, it became a gaming device, social media hub and a camera too. You only have to take a look at a busy high street or any large gathering of people at an event and you'll see more hands holding up a phone to record a moment than anything else. Sales of smartphones have increased and this has had a knock-on effect in the world of the digital camera. The compact digital camera is feeling the effects of the rise of mobile tech and in recent years, demand for an entry level digital camera has waned. Casual photographers have turned to their camera phone, a device that is now so ingrained in our culture, it's hard to imagine a time when they didn't exist. Whilst images taken on a camera phone cannot rival the quality of DSLRs at the moment, the leaps in technology being made have closed the gap considerably.

The world of the smartphone is full of strong competition. It seems that at every turn, a new phone appears touting the next best thing in features, power and price. It is an odd situation we find ourselves in these days that when you choose a new phone, you're basing that decision on a set of features that are not connected to the original function of the device, which is as phone. Indeed, if you look at all the marketing surrounding the launch of a new smartphone, it is the capability of the phone as a camera and social media tool with all its attendant bells and whistles that sells it. The new Samsung Galaxy S9 and S9+ range is no different, but there is an awful lot to like about this new smartphone on the block, particularly if you are a keen photographer or have an eye for videography. Samsung have been shouting about how they have reimagined the camera, and that has been the biggest upgrade you will encounter on the new Galaxy S9 phones. So what do these upgrades mean for the budding photographer potentially wanting to invest in Samsung's shiny new device?

With features that give you more control of your camera phone, and the ability to shoot in Raw format, you can go beyond the selfie and get even more creative.



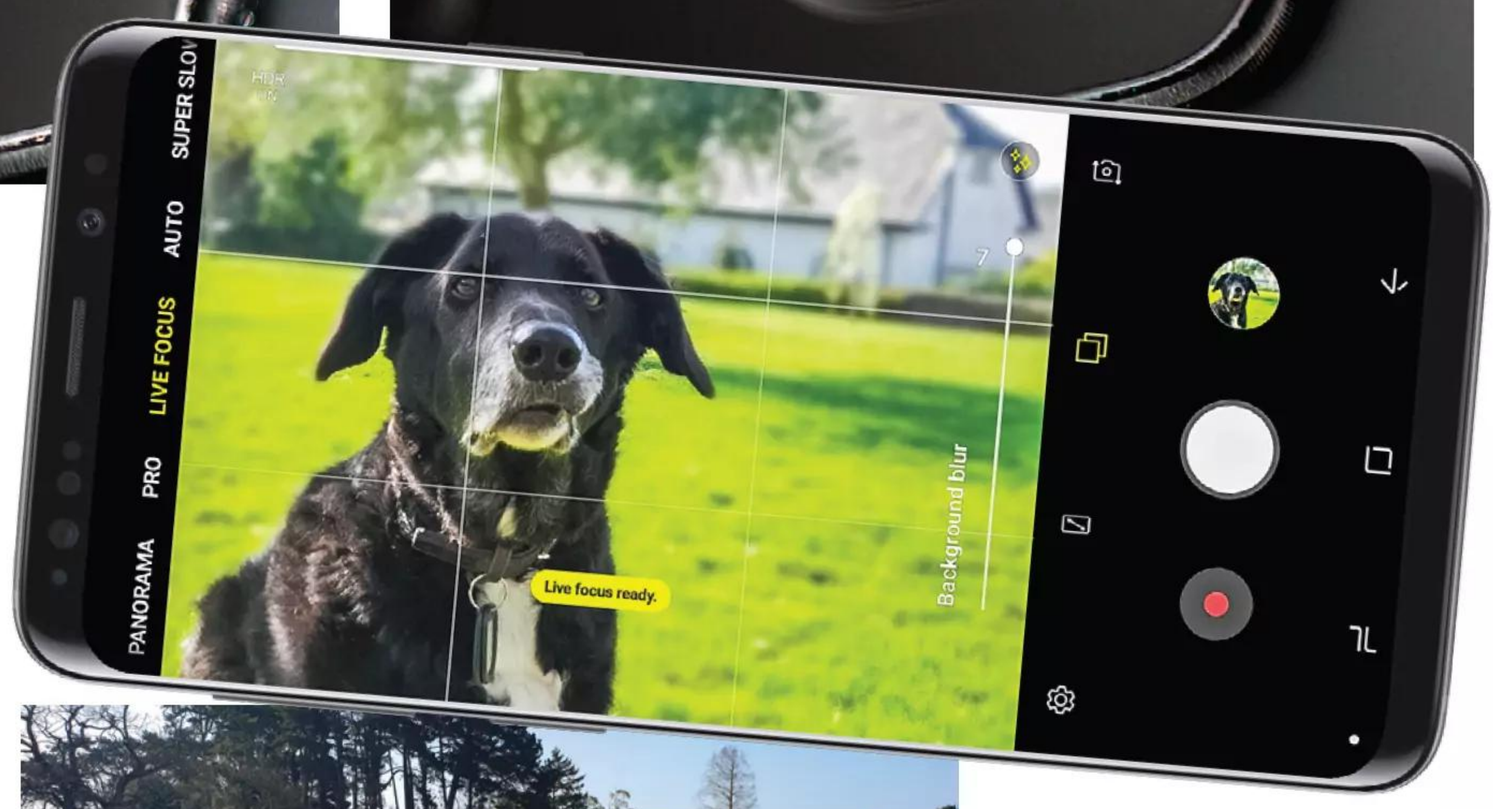
A mechanical dual aperture allows for more fine tuning of your exposures.

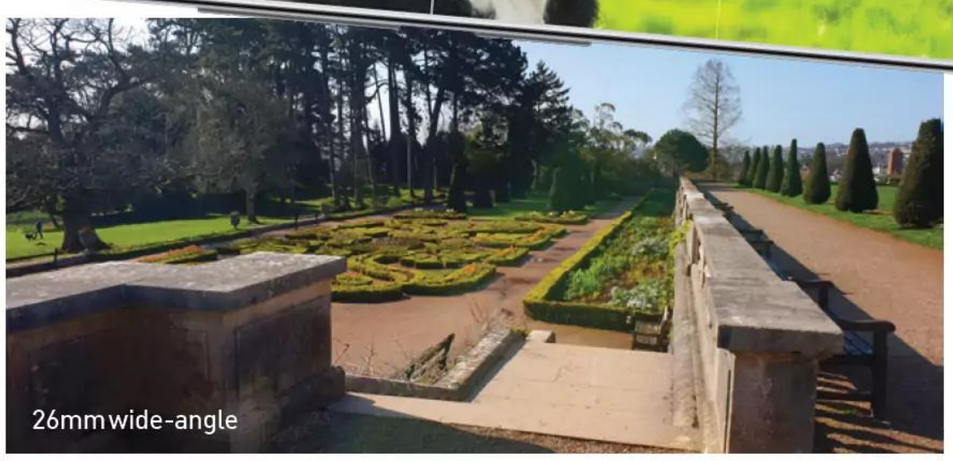
Specs and features

One thing that hasn't been upgraded is the pixel count. It still uses a 12MP sensor for its rear facing cameras and 8MP for the front-facing selfie camera. The S9+ has two rear cameras, and this is where things get interesting. One camera is 12MP with an f/2.4 telephoto lens which offers x2 optical magnification for better quality over the digital zoom you may be used to. That said, if you want to get even closer, you can use up to x10 digital zoom if you need it.

Dual aperture

The other camera is what traditional DSLR camera users may find interesting. Camera two uses a wide angle 12MP image stabilised setup with a dual aperture. It has a small mechanical aperture that behaves just like your own eye, with the iris narrowing in bright light, and opening wider in darker conditions to allow more light in. Its widest aperture is f/1.5 for maximum light-gathering ability, and can automatically stop down to f/2.4 depending on ambient light conditions to reduce the amount of light falling on the sensor. If you plan to shoot in fully auto mode, you can get crisp, well exposed images without any issue at all, with the aperture automatically reacting to light levels as you shoot to optimal results. Be aware that the S9 only has the front facing 8MP camera and one 12MP variable aperture camera. If you feel you can't do without that additional telephoto camera as well, then the S9+ is what you need.





(Above) The LIVE FOCUS mode on the camera simulates the shallow depth of field you can achieve with DSLR lenses that have large maximum apertures.

(Left) You have the option of using the wide-angle camera with a focal length roughly equivalent to a 26mm DSLR lens and the telephoto camera which is equivalent to 52mm.

Using the camera

The camera app itself is easy to use and quite intuitive. There are plenty of different filter effects you can apply and shooting modes to keep you entertained, including PANORAMA mode and HYPERLAPSE mode which can record and compress many hours into a few seconds of video. There is also LIVE FOCUS mode that simulates professional wide aperture lenses to achieve large amounts of background blur behind your subject. You can also add background blur shapes. If you shoot something that has lots of pinpoints of light, they will appear as out of focus orbs. Using background blur shapes, you can turn those orbs into stars, snowflakes, hearts and even rabbit ears. AR EMOJI is an augmented reality mode that scans for faces within the frame of the camera and in real time applies a virtual 3D emoji over the face of your subject. From bunny rabbit to clown, your friends and family are about to get an unexpected virtual makeover.

Low light performance

The low-light capability of the S9 and S9+ has also been improved. When used in conjunction with that variable aperture and optical image stabilisation, you can shoot handheld when you might normally be reaching for a tripod or a solid surface to rest on. Since the camera has to increase its sensitivity to light in darker lighting situations, image noise can become a major problem. The S9 and S9+ can get around this by taking multiple images of the scene at once and use that information to reduce image noise by up to 30%.

4K and more

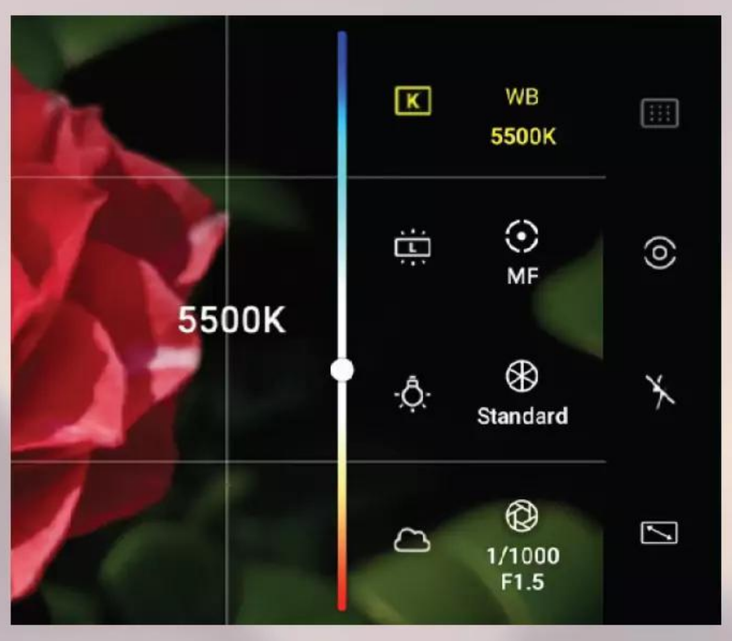
The video capabilities are also impressive for such a device. Although resolutions such as 4K are becoming quite common, the Galaxy S9 can shoot at a very impressive 60 frames per second, where most can only manage 30 frames per second. You can even shoot 9.1MP images whilst recording in 4K at the same time. Moreover, if you feel in the mood for some slow motion action, then you have the option to shoot super slow at an amazing 960 frames per second in 720p resolution. To put that in perspective, a normal video plays back at 30 frames per second, if a sequence captured at 960 frames per second is played back at normal speed, it will mean the action has been slowed by a factor of 32. That can make for some cool slow motion sequences.

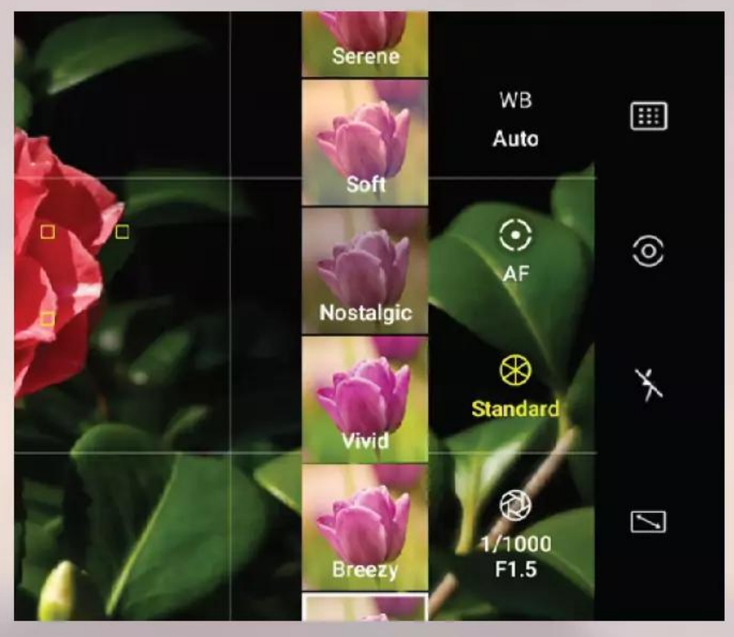
Shoot like a pro

Amongst the various modes you can access is PRO mode. Unlike AUTO which pretty much takes you out of the decision among process apart from composing the shot and pressing the shutter button, PRO mode hands over complete control of the camera to you. Now you can really get to grips with some of the more technical and creative aspects of photography. You can try out what each control does to your image, with the instant feedback of the large screen to guide you. It is actually a great way to learn what is happening as each setting changes. In AUTO, you don't know what is going on and are relying on the camera to do the work. Now, you are in control. PRO mode offers control of white balance, methods of focusing, which aperture size you want to use, ISO sensitivity, as well as the metering methods. It really is like having control of a DSLR without the bulk of a DSLR. Although you might feel a bit foolish, using a tripod and a smartphone holder means you can keep ISO settings low and use longer exposures without fear of camera shake ruining the shot.

Take control

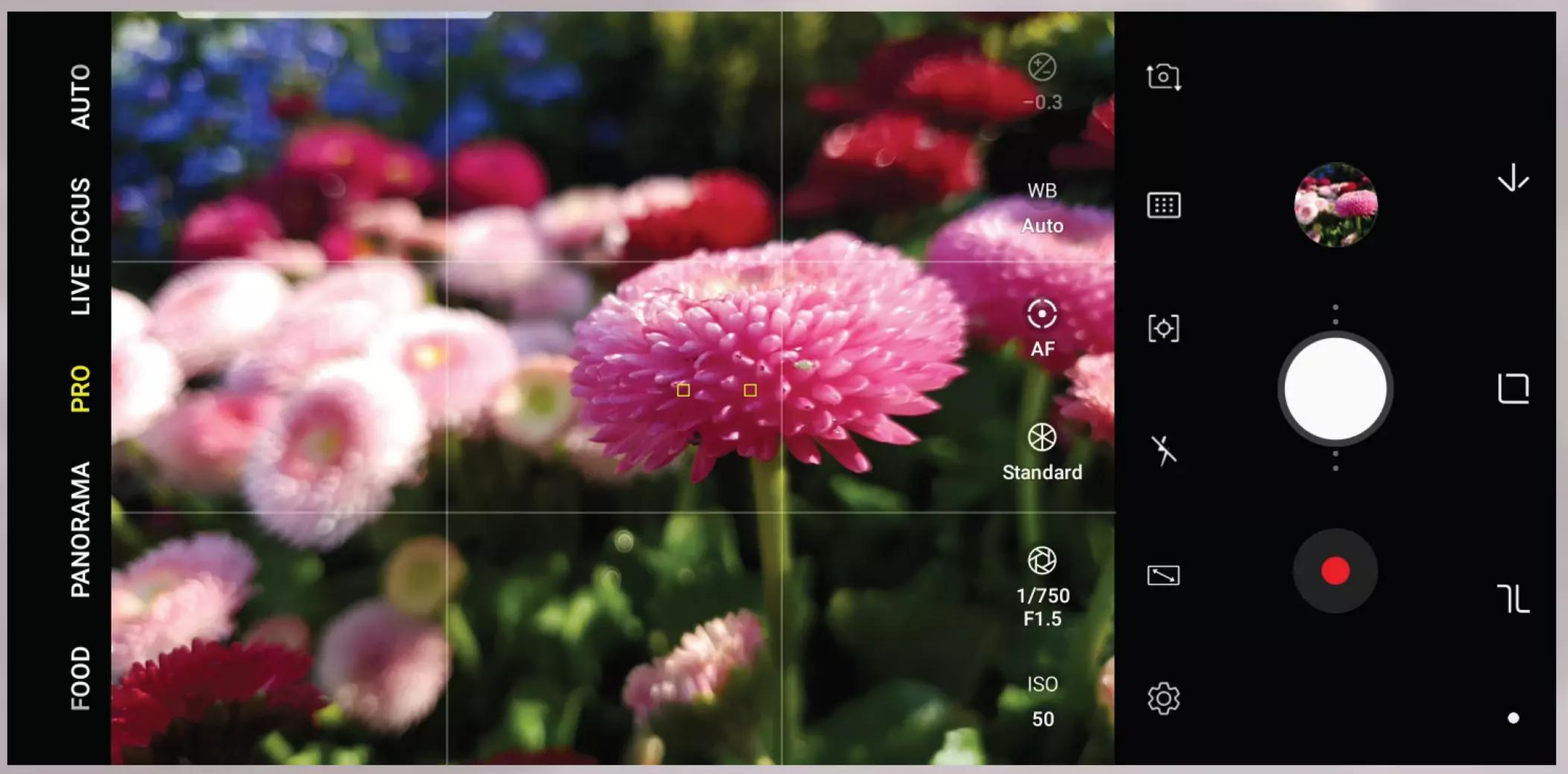
Now you can decide on the shutter speed, what ISO to use, where to focus in the scene. You can even dial in amounts of exposure compensation. This lets you deliberately overexpose and underexpose a shot based on your personal preferences. PRO mode is a superb way of dipping your toe into the world of manual photography, you can experiment to your heart's content and not worry about getting it right first time. The f/1.5 - f/2.4 dual aperture also allows you to choose whether you have more or less blur in your background. Choose f/2.4 for a sharper front to back image, or f/1.5 if you want more blur beyond your point of focus. This is best achieved by having your subject much closer to the camera than they are to their background. Have fun, after all the best way to learn is to do. People often believe that photography is dark art, but once you've tried PRO mode on the S9 or S9+, you'll begin to realise that it's not as scary as you might imagine.





Beyond the selfie

Having all this control means you can step outside the traditional comfort zone of the smartphone and try some more creative photography. You can experiment with focusing very close to a subject and blurring the background by using the wide f/1.5 aperture. Better still, why not venture out at dusk and shoot some longer exposure images. You can actually shoot exposures up to 10 seconds in duration. Some other smartphone cameras do allow for up to 30 second exposures, but 10 seconds is not to be sniffed at and works great for most shooting situations. Why not buy yourself a smartphone lens kit? These tiny clip-on lenses give you even more creative freedom. Put on a wide-angle adaptor to get even more of that huge scene in your shot, or try a macro lens to get incredibly close to that beautiful flower or butterfly and fill the frame with it.



When shooting Raw files in Pro mode, the opportunity to process those files in programs like Lightroom can transform your photos hugely. Compare the original here to the final image below after it was adjusted and enhanced.

PICTURE SIZE (REAR)
4:3 (12 MP) 4032x3024
4:3 (6.2 MP) 2880x2160
16:9 (9.1 MP) 4032x2268
16:9 (3.7 MP) 2560x1440
18.5:9 (7.9 MP) 4032x1960
1:1 (9.1 MP) 3024x3024
1:1 (4.7 MP) 2160x2160
Save RAW and JPEG files
Save JPEG and RAW copies of pictures taken in Pro mode.

(Above) You can choose your picture sizes for the camera and also choose to save your photos in Raw format for any shot taken in Pro mode.

In the Raw

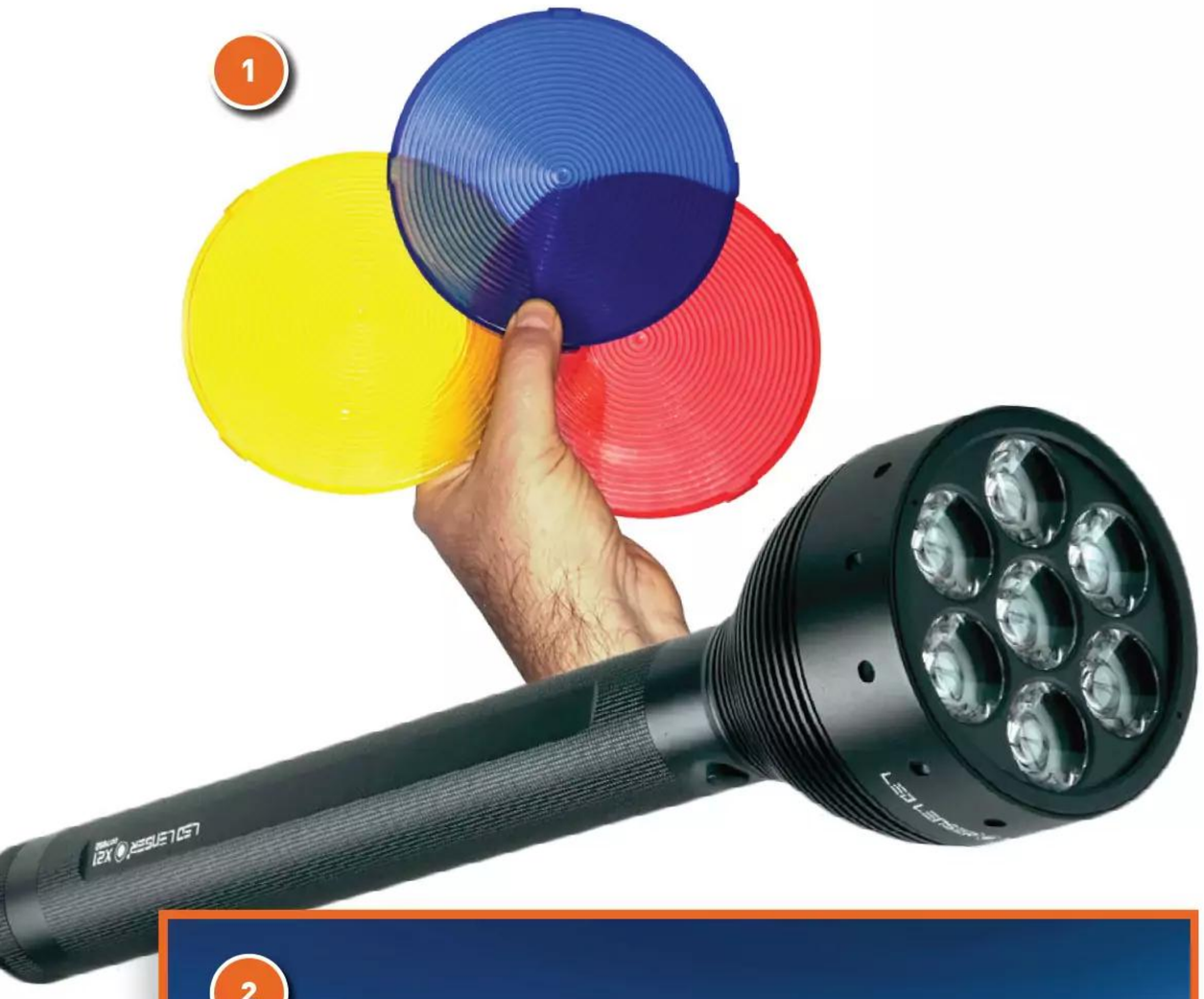
Another feature available on the current range of S9 phones, is the option to capture your images not only as standard Jpeg files but also as DNG Raw files. A Raw file is the professional's image format of choice when using a DSLR as it is basically an unprocessed readout of the camera sensor. No processing has been done to it and it contains more data than a processed Raw file. Now, you can choose to capture in Raw on your phone too. Be aware though, that the Raw option is only available in the PRO mode. Once you have captured the shot, you can transfer it to your computer and process the image using a Raw editor such as Adobe Lightroom. You'll be amazed how much you can squeeze out of a Raw file and take your photos to the next level. We live in an age of great technology, and the once humble mobile phone has become a worldwide communications device, small computer and DSLR all rolled into one.

Light painting

Light up night shots with some simple techniques

Light painting is a photographic technique in which exposures are made by moving a hand-held light source. The term light painting also encompasses images lit from outside the frame with hand-held light sources. The latter is what we are looking at in this example. You don't necessarily need huge, complicated, flash setups to produce some amazingly lit images. With a subject to photograph, your camera on a tripod, one torch with a couple of coloured gels [1], you can light paint to your hearts content.

This is an example of one type of light painting technique that uses, 'a big brush', shall we say, to colour a scene in large swathes of light. In our example we have a car parked with a nice evening sky behind it. The camera was set on a tripod and recorded a basic reference image **[2]**. Then it was



> "The method of creating individually lit images gives you more control over the look of the final shot."

The final image of the mini is a combination of 6 shots where it is lit from various angles with different coloured lighting. It also includes the lit interior and the headlights.

introduce some more colour and light. Each light painted exposure was set at f/5.6 for 20 seconds at ISO 200. This meant that the background was slightly underexposed and our 'paint' would show up well. It took a bit of trial and error, but for each 20 second exposure, the torch could be used to paint the car for about half of that exposure time - so about 10 seconds. The torch was kept at roughly the same distance from the car each time. So all that we had to do now was take a succession of exposures, lighting the car with the torch and using different coloured gels **[3-6]**. Basically you can experiment all you want as all the single exposures could be combined in Photoshop later. We even put the torch inside the car to light the interior.

You could of course set your exposure to give you enough time to do all your light painting in one go. This would take a bit of working out with both the camera settings and the amount of light you need from the torch. One error means the shot is potentially ruined and you have to start again. The method of creating individually lit images gives you more control over the look of the final shot by being able to add and subtract the shots you don't feel contribute to the overall look you are after. ■

In-car long exposure

A different take on traffic trail long exposure images

On a personal level, this is something I always wanted to try. We have all seen long exposure images of night skies and the infamous traffic trails. This just takes that basic idea and changes the point of view to favour a driver in his car with the world going by outside at hyper speed. It goes without saying of course that the speed is achieved with a long shutter duration rather than breaking either the speed limits or the laws of physics! In our example we will show you the basic setup to achieve the end result you see here.

Because it was shot at night, the shutter speeds we are working with are right in the so-called 'butter zone' to get a good 'hyperspace' look to the streetlights and car tail lights zooming by as you drive at a nice and legal limit. In our case that was a leisurely 30mph. You could shoot an equivalent daytime version but it would mean being able to get a shutter speed somewhere in the order of 2-4 seconds. This can be done if you have a neutral density filter capable of cutting out enough ambient light to give you the exposure time you'd need.

A night time drive becomes a surreal journey into hyperspace with a little twist on the familiar traffic trail long exposure shots. Turn the page and read on to discover more about how these shots were created.

This cable release makes the process of shooting long exposures much easier and also doubles as an intervalomter.

The Gorillapod can secure smaller cameras with its strong but flexible and multi-jointed leg arrangement.

The Canon EF 15mm f/2.8 fisheye lens. Great for ultra wide angle capture if you are in cramped conditions.

For those using crop-sensor cameras a 10-22mm (16-35mm equivalent) is a great wide angle zoom lens for wide FOV.

Back to our night time version. The checklist for this effect is fairly straightforward. You will need your camera that is either able to shoot up to 30 second exposures or, in the case of exposures longer than 30 seconds, is capable of bulb exposures. A bulb exposure, usually shown as a B on your camera's settings, is a setting that allows the camera to keep the shutter open for an indefinite amount of time. This period of time can be controlled either by the photographer with their finger depressing the shutter release button for the desired amount of time, via a shutter release cable attached to the camera or using a device called an intervalometer which can automate the process without your input. You just set an exposure time, how many shots you want taken and the interval between each shot. Our example has us working around the 2-4 second area, so in this case the camera can be set accordingly just using manual settings.

Lens choice comes down to personal preference. Our example was shot using a 15mm fisheye lens so you can see a lot of the car's cabin and the front windscreen and side windows. A 10-22mm crop sensor lens (16-35mm equivalent) will also do well. It may be that you have to set the camera further back in the car to get a wider view if that is what you want.

The camera will need to be kept immobile for the period of the exposure. A tripod will be essential. That said, if you are tight for space in the vehicle and the tripod doesn't really fit, you can always bungee the camera to the passenger seat headrest or secure it on the rear parcel shelf. If you are working with a smaller, light camera, the Gorillapod by Joby is a good option for securing a camera. The Gorillapod is small, light and very flexible.

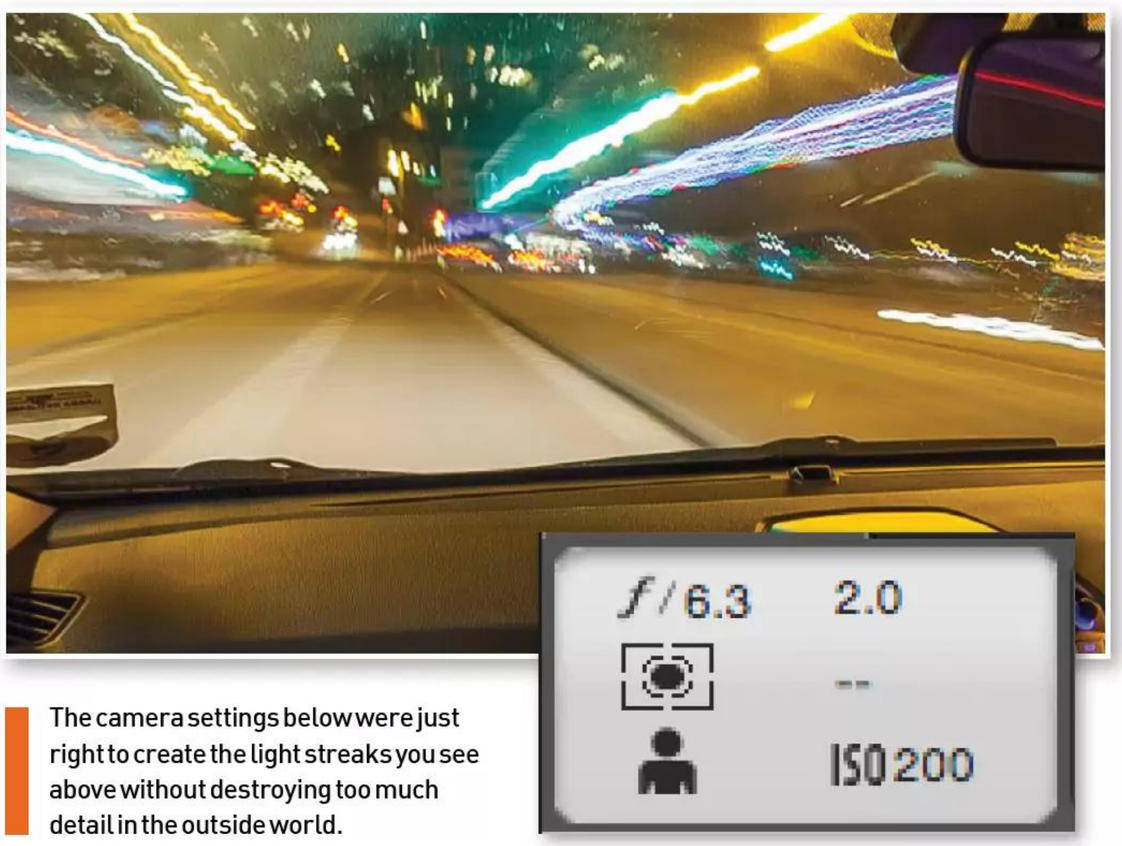
So, you have your camera, lens and means of securing it inside your vehicle. You can set yourself up in the back with the camera and get your driver of the vehicle to start driving around the night-time roads. This option is great of course as it means you can do test shots to get the look you are after. It is worth noting that the previously mentioned 'butter zone' for this long exposure effect is based partly on personal taste. Our experience of this type of shot leads us to recommend exposures somewhere between 2-4 seconds. We say this as we think a longer exposure time has greater streaking of lights but less detail and a shorter exposure time just looks too normal. We are after a good hyperspace effect but with enough detail left to see that you are driving on a road.

Sitting in the back with the camera and doing testing shots on the move is not an option for many as they may get terribly motion-sick if not looking where they're going. So in this case we found somewhere where the lighting would be similar to what we'd encounter on the road, set up the camera and lens on a tripod and positioned it above the passenger-side headrest looking out through the windscreen. The focus was set manually on the windscreen as this offered a good degree of sharpness in the shot both inside and out. Because of the wide angle there was a lot of the cabin on view. A few test exposures had settings of 2 seconds at f/6.3 with ISO 200 to get the best exposure of the cabin and the world outside. Now the problem was how to drive a car and be able to take shots whilst on the move.

The cable release mentioned earlier would have been a good option as it meant you could activate the shutter release with one push of a button and keep your attention on the road. There is also the option for wirelessly activating your camera. For a modest £60 you can get a device such as the Giga T Pro II. It is a 2.4GHz wireless remote control and intervalometer. It comes with a transmitter and a receiver which you attach to your camera's hot shoe and plug into the cable release port with the supplied cable. It doesn't require line-of-sight and can actually be used through walls to set off your camera.

Wirelessly triggering your camera is a piece of cake with a device such as the Giga T Pro II. Affordable and reliable, it is worth the relatively small outlay.

After a bit of trial and error, we were able to secure the camera just behind the passenger seat with the tripod wedged between the rear seat and footwell. The 15mm fisheye could capture a wide field of view inside the car and with the wireless transmitter in the driver's lap we could easily active the camera via the receiver attached to the camera hot shoe.



The camera settings below were just right to create the light streaks you see above without destroying too much detail in the outside world.

If you are feeling brave, you can attach your camera to the outside of your vehicle, or at the very least, have it lashed to the door pillar looking out an open window. Although it is definitely worth having someone on hand to grab it if it comes loose.

We were good to go and set off with the Giga T Pro II transmitter on the driver's knee. All that was needed was to press the button and the camera would fire using the manual settings. The trick was to shoot on a straight stretch of well-lit road and keep both driver and the steering wheel as immobile as possible because any movement during the exposure would result in too much motion blur. The only blur we want is the world outside streaking by. We traversed a stretch of road a couple of times and then pulled over to review the result. This is where we found a 4 second exposure was slightly too long and anything under 1 second was too static. 2 seconds seemed to be the ideal result for the road conditions we were driving in. If you were driving on a fast motorway doing 70mph then the amount of light streaking would be greatly increased for that exposure. It is just down to a case of personal preference.

All we had to do then was get home and review and process the favourites. The result is what you see here. There are those that take this idea one step further and attach the camera to the outside of their car or motorcycle. If you have a suitably robust method of securing your equipment, then this can make for some supremely dynamic images. ■

Shooting panoramas and vertoramas

We show you how to think big and shoot big

The word panorama means ‘an unbroken view of the whole region surrounding an observer’. In more simple terms, it means a photograph containing a wide view. A vertorama is simply a panorama that is shot in a vertical orientation. It all came about in the 1700s when artists would paint a horizontal image that encircled an entire room. These wide, expansive views are much prized by landscape photographers who strive to capture entire vistas to give the viewer of the final image a sense of the scale of the scene that was visible

to them whilst they were there. Conveying all this 'bigness' would normally require the use of wide angle lenses. These lenses have short focal lengths of around 14mm to 24mm and can capture an angle of view of around 90° measured diagonally across the frame. This angle of view is an aspect of landscape photography that can be a slight issue for some.

Seeing is believing

One thing that a lot of people comment upon is that the scene they view with their own eyes always looks far grander and more impressive than the photograph they take of it. Human vision is amazing, it can encompass an angle of view that is almost a complete 180° if you take peripheral vision into account.

Of course a photograph is not going to be quite so impressive. However, there are methods that can let you capture super-wide vistas that go some way to emulating human sight. We have some tips on capturing entire majestic panoramas that will make your viewers go 'wow!'.

The images shown here are great examples of super-wide panoramas. Both are comprised of multiple portrait orientated shots and were merged using the Photomerge option in Photoshop. They each cover an angle of view of more than 180°.

This coastal image was captured on a Nikon D810 using a 15-30mm Tamron ultra wide zoom lens. Although the shot covers a roughly 100° angle of view as measured diagonally across the frame, there was still a lot more to be seen either side of the image that couldn't be captured in one go.

From left to right you have the Nikon 14-24mm wide angle zoom at around £1800, the Canon 8-15mm fisheye at £900 and the Samyang 14mm wide angle prime for about £350. They excel at capturing wide views, but what happens if you either don't have that kind of cash or actually want to shoot wider panoramas than they are capable of?

The lens option

We mentioned that the best guy for the landscape photographer is the wide angle lens and those serious about capturing extremely wide views will be using a lens somewhere in the 14mm focal length range. Lenses like this have roughly a 105° angle of view, which is great. You can capture some impressive scenes with a 14mm lens. The problem for most budding photographers is that a major brand name lens like that is going to cost upwards of £1500 for a fixed focal length version. Step up to a variable focal length 14-24mm wide angle zoom lens and you can expect to pay a lot closer to £2000. That is out of the reach of most photographers. Manufacturers like Samyang do make a 14mm f/2.8 lens available in Canon, Nikon, Sony, Samsung and Micro Four Thirds fits at a much more reasonable £350. Be aware that a full-frame 14mm lens fitted to an APS-C camera for instance will actually behave like a 21mm lens, due to the smaller size of the sensor the full-frame image is projected on to. In this sense, the benefit of that 14mm focal length has been lost.

That said, even in a normal frame taken with a wide angle lens, it is still only a relatively small part of the bigger picture.

Fisheye

Another option to capture large angles of view in your shots is to use a fisheye lens. A 15mm fisheye can capture an almost 180° angle of view image. The effect of a lens of this type is the distortion. Fisheye lenses are designed to actually show the spherical distortion you would normally not want to see in an image. The centre of the frame is quite acceptable but as you get to the edges of the image, you'll see the curved outer corners produce a goldfish bowl effect. For landscapes, this is not usually a desirable effect. Yes, you can remove the distortion at the post-process stage but that involves enlarging and distorting the image still further to remove the spherical view created by the lens in the first place. Any views that have strong horizontal or vertical lines in them will appear like something you would see in a funhouse mirror, so they are to be used with caution for landscapes. This still doesn't allow us to see the much broader canvas that our eyes see.

The alternative

What happens if you do not have a wide angle lens or a fisheye? What are your options then? A lot of photographers who step up to a DSLR for the first time, will probably purchase a camera with a kit lens. A kit lens is a utilitarian jack-of-all-trades that can get you started in the world of photography. If you choose a cropped sensor camera such as a Canon 1300D or Nikon D5600, it invariably comes with a kit lens in the 18-55mm focal length range. In 35mm full-frame terms, the images you capture with it are actually more like a 27-82mm lens. A scene shot with this lens in landscape orientation is not going to be terribly impressive. It isn't a problem though since you can use the multi-image approach instead. Rather than take one landscape orientation shot, you simply turn the camera to portrait orientation and shoot a sequence of images for stitching together later. Let's explain in a little more detail.

The process

Essentially you are going to take a number of stills. Rotating the camera a few degrees left to right with each shot taken, whilst allowing enough overlap from image to image so that they can be stitched

together. This can be achieved with programs like Photoshop, PT GUI or Hugin, that rely on features in each shot being matched together to create accurate stitching points; as a general rule, shoot with a shorter focal length lens and always try to overlap your images by 25% or more. For example, look for features that are right-most in your current shot like a car or building (something that isn't moving). For the next shot you rotate yourself on the spot so that those features are now left-most in the frame. These matching features will help your software to stitch the shots together more accurately and avoid odd tearing and mismatches that can spoil the image.

Another consideration is to try and avoid a scene where a lot of objects are very close to the camera. Unless you are using specialist panoramic photographic equipment and lenses, you will find that even slight unwanted movement and rotation of the camera (which is unavoidable if you shoot handheld) will result in big parallax shift errors in very near objects that even the best software will not be able to put right. Parallax shift describes how objects close to you seem to move a greater distance relative to those that are further away when you move your head or camera.

The bigger picture

The benefits of shooting multi image panoramas are twofold. You are of course capturing a much wider view than is possible with just a single shot; the other benefit is that when the image is stitched together, it creates a much larger file, containing more detail than a single ultra wide image. As an example, this scene was captured with 5 portrait orientation shots, each measuring 3333 pixels wide by 5000 pixels high. When the 5 shots were merged in Photoshop, the resulting panorama, once cropped, measured 9768 pixels wide by 4676 pixels high. Roughly speaking, the result is a 45MP image. Granted you do need a reasonably powerful machine with plenty of RAM to work with large files but the results are quite impressive.

Settings to use

To capture a basic panorama from left to right you can set up your camera in the following way. First, set your camera to portrait orientation and set focus to manual. Select a point of focus roughly a third of the way into your scene. This is an utterly basic rule of thumb to quickly set yourself up to record as much sharp focus in your scene as possible. Working out the exact point into the scene that gives the best overall focus based on your aperture, referred to as the Hyperfocal Distance, is not to be approached lightly. For our purposes the most basic approach will do for now.

Your camera settings need to be set in such a way as to produce as little noise as possible but keep a fast enough shutter speed to avoid camera shake or motion blur. Camera shake is a main concern if you are going to choose to shoot hand-held and we would always recommend using a tripod whenever possible. For shot-to-shot colour and exposure consistency, it is always a good idea to shoot in manual mode and use a preset White Balance setting rather than Auto White Balance. If you shoot in Raw format, this is less of a worry since you can non-destructively alter the white balance of each shot to match your favoured colour temperature. With trial and error you can arrive at settings that yield enough detail on the ground and the sky without either losing detail in shadows or blown out highlights. It is also a good idea to use a narrow aperture of at least f/8 to ensure that your entire is a sharp as possible from front to back.

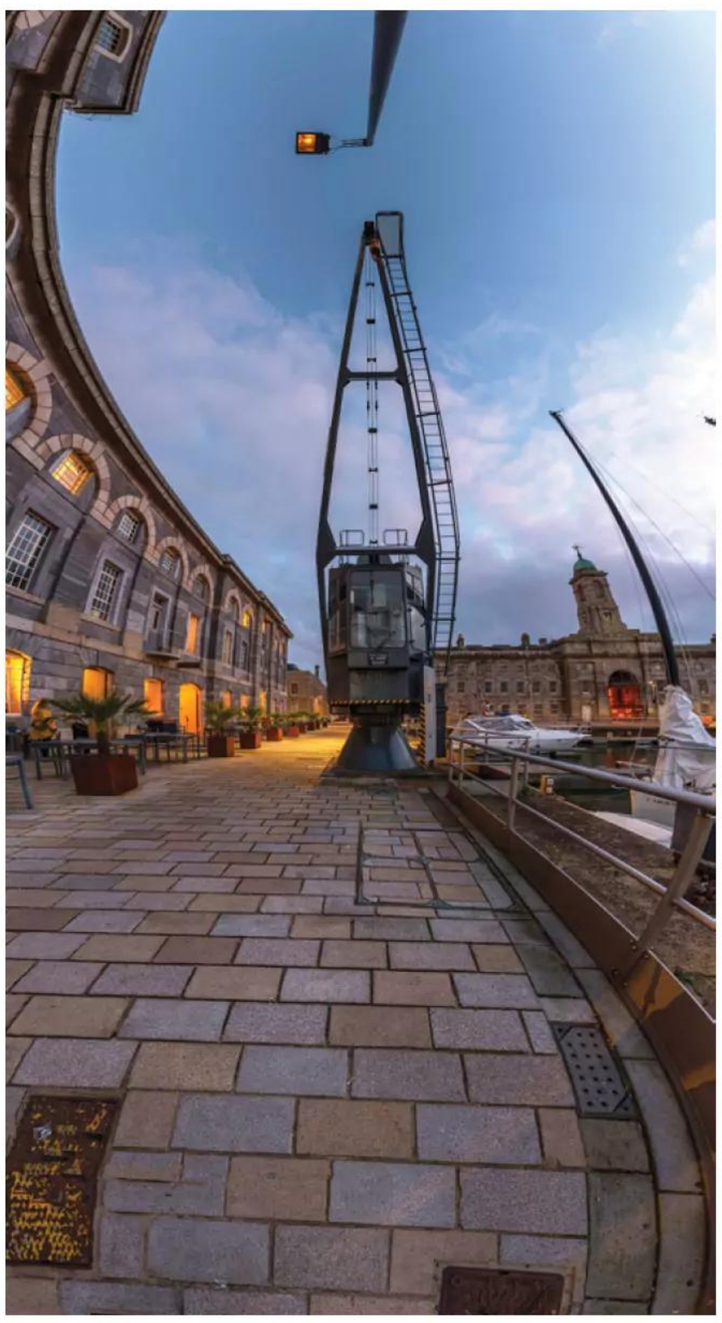
More accuracy

We would always recommend the use of a tripod when shooting panoramas. It creates a nice stable platform with rotation that is easy to control in both the horizontal and the vertical. You can level both the tripod and then the camera on the tilt-head by using a small spirit level that can attach to the hot-shoe of the camera. For even greater stitching accuracy, you can attempt to rotate the camera around its nodal point. The nodal point is the point around which the lens must rotate in order to completely eliminate parallax shift. Without specialist equipment it can be very difficult to achieve. The hi-tech method for shooting accurate panoramas is a device such as the Nodal Ninja. It is made from metal and is very robust with an optional levelling plate to provide a very quick way of getting things on an even keel. You can quickly shoot accurate and level panoramas with devices such as this. There is a very low tech way you can do it yourself, whereby you rest the camera lens barrel on a pole or stick (even a sawn-off broom handle) so the front lens is as near the pole's centre of rotation as possible. It will be up to you to keep the camera as level as possible but it does help avoid those nasty parallax shifts. Oh, and people will wonder why you are rotating around a pole stuck in the ground!

On the right are two approaches to getting more accurate panoramas. The first is to attach your camera to a Nodal Ninja so the camera rotates around the front lens element. A quick method to emulate this piece of equipment is to place your camera on a pole with the lens element as near to the centre of rotation as possible.

The Nodal Ninja is perfect for capturing accurate panoramas in horizontal or portrait format. Once the camera's nodal point is established, you can shoot full 360° pans if you want.

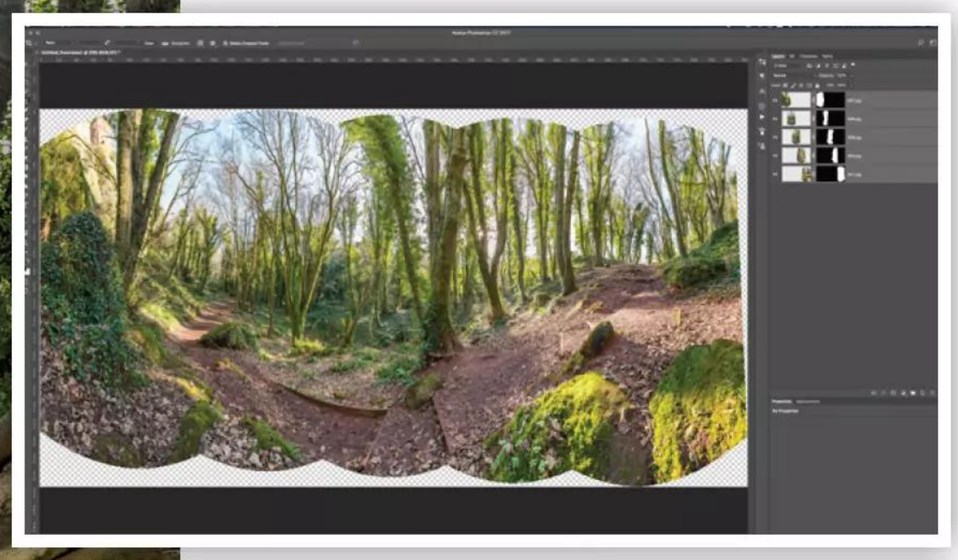
Whether you are using a tripod or a more advanced Nodal Ninja, always try to get it as level as possible. Most tripods feature a small bubble level. If it doesn't have one, you can always get a small spirit level that fits in the hot shoe attachment of your camera.

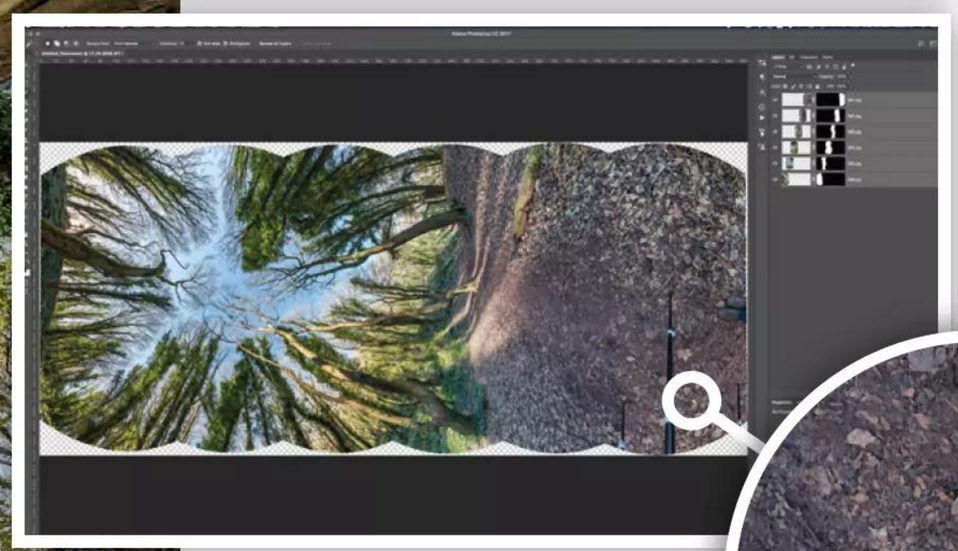


Shooting horizontally is one thing, but when you start shooting vertically, it creates a whole new look and feel for your photos. Shooting enclosed spaces and tall objects with a wide angle lens makes for some very unique looking images that wouldn't be out of place in an M.C. Escher lithograph.

Go vertical

There may be certain times when you might need to capture a panorama that doesn't fit into our happy horizontal world. Sometimes, you need to think vertically. Vertical panoramas, or vertoramas as they are called, can produce some very spectacular and mind-bending images. The methods for shooting a vertical panorama are the same for those you would employ for a normal one. This time, you can actually shoot with your camera in landscape orientation but you pan from the ground and rotate the camera upwards to the vertical, and even over the vertical if you can stretch far enough (just don't fall over). Shooting a vertorama in the woods, city centre or an enclosed space such as a church or cathedral





All the shots you see here were merged into their final panorama or vertorama by using the Photomerge option in Photoshop CC. The vertoramas will require some additional work to clone out either your own feet or the legs of the tripod you were using that will most likely be captured when shooting directly downwards with a wide angle lens.

> "There may be certain times when you might need to capture a panorama that doesn't fit into our happy horizontal world."

can produce some intense images. You are likely to end up photographing your feet or the legs of your tripod when shooting directly downwards but once you have stitched the images in Photoshop or other favourite program, you can crop or clone them out. With this in mind, make sure you give yourself plenty of room at the bottom of the frame for cropping.

Go wide

Shooting panoramas, whether horizontally or vertically, is a very diverting method of landscape photography. It does mean you are working with a large number of files and they need all that extra work to stitch them together but the result is a very large image file that is significantly larger than a single shot from your widest lens. Not only that, it contains a vast amount of detail and its larger combined resolution means that if it were ever needed, it could be printed at a huge scale with a reduced loss of detail. Give it a go: you can start with hand held versions and if you you like it, you can upgrade to a good tripod; or better still, get yourself a Nodal Ninja for the ultimate panorama. ■

Shallow depth of field

Isolate your subject using narrow depth of field

Careful control of depth of field by adjusting aperture and focal length is one of the most striking creative techniques available to the photographer, and you don't need any special equipment to do it, just your camera and a zoom lens.

For this lovely butterfly image, the photographer has used a 100mm, fast macro lens with a large maximum aperture of f2.8. This has resulted in a narrow depth of field but by carefully focusing on the creature's body the effect of this narrow plane of focus is to isolate the insect against what could otherwise be a very busy and distracting leafy woodland background.

One consideration to bear in mind is that when working with very shallow depth of field, precise focusing is essential. The slightest movement and your subject will shift out of focus, so a good tripod is recommended to eliminate those shot-spoiling effects. ■

> "Large focal length lenses will demand higher shutter speeds and a good tripod."

The Canon EF 100mm f/2.8 L series macro lens. Perfect for macro shots at 100% magnification, with the added bonus of image stabilisation for more opportunities to shoot handheld. You can shoot as close as 30cm and the f/2.8 aperture enables you to create beautiful background blur in your shots.

If the background of your outdoor photo is distracting, you can blur it out by using a wider aperture to create a narrow depth of field.

Enhance your photography

A word about using filters and why they are still so useful

As your photography skills increase and you delve deeper into the techniques available, you are very likely to encounter words like Neutral Density Filter, Graduated Filter and Polarising Filter. Filters, in this case, are not the kind of effects you add in Instagram at the touch of a button, these are physical items that are attached to your lens to alter the incoming light that is hitting your camera's sensor. Don't think of these filters as somehow being old-fashioned and just opt to do it all in post, filters are still a very relevant aspect of your photography skills and techniques and that's why we wanted to introduce a few of them to you and give you an idea of what they can do.

The idea of shooting a well-balanced exposure and getting it as perfect as possible in-camera is a skill worth pursuing. There are a number of filters that produce effects which are difficult, if not impossible in some cases, to reproduce in Photoshop. We would always encourage any photographer to consider trying to achieve more in-camera at the time of shooting, while discovering what a pleasure it can be to get more hands-on with the photographic process when you are actually out in the field. ■

> "The idea of shooting a well-balanced exposure and getting it as perfect as possible in-camera is a skill worth pursuing."

A Cokin filter holder for square filters can be attached to any lens with an adaptor ring.

Filters essentially come in two flavours: round and square. The round ones are threaded and screw directly onto the front of your lens, if you have a lens with an 82mm diameter you will need to purchase a round filter with the same dimensions. This can be a bit tricky if you want to use other lenses with different size screw threads, as it would mean buying more than one size of the same filter, which could get very expensive very quickly.

The alternative is to purchase a square filter system, this comes with a filter holder which screws onto your lens and if you have several different size lenses you can get adaptor rings for attaching the holder to any lens you want to use. The square filters, which the holder uses, are all the same size so you only need to buy one filter of any given type. There are plenty of manufacturers out there making both round and square filter systems. Lee, Cokin, Hoya, Kenko, Benro and Kase are some of the more well-known and popular systems, but there are any number of cheaper alternatives. Be aware though, if a filter or filter system from an unheard of company appears to be very inexpensive, it probably means that the filters are made from sub-standard materials, often they are made from cheap plastic and a filter that is meant to be colour neutral is in fact, anything but.

We love using filters when out on a landscape shoot, they can transform your images and it's very freeing not to be shooting with Photoshop firmly in mind for the end of the image-capture process. Why not get out there, go old school and get some filters in your life? Here's a list of some we think you should have in your kit bag.

The UV and skylight filter

The skylight filter has a very subtle pink tint to it, which was originally created to reduce the blue cast found in colour film stock and both the UV and skylight filters are also designed to filter out a certain amount of ultraviolet light in an attempt to reduce haze. These days, with the advent of digital cameras, the need to correct the blue cast no longer exists and many modern lenses have special coatings that can do the same job as these filters, so why have them at all?

The truth is, they are now mainly used to protect the front element of your lens from the ever-present danger of contamination due to dust and dirt, as well as to safeguard against scratches, better to scratch a cheap UV filter than ruin a lens worth hundreds or even thousands. Since their main function is the protection of your lens, round screw-on UV and skylight filters are the best option here.

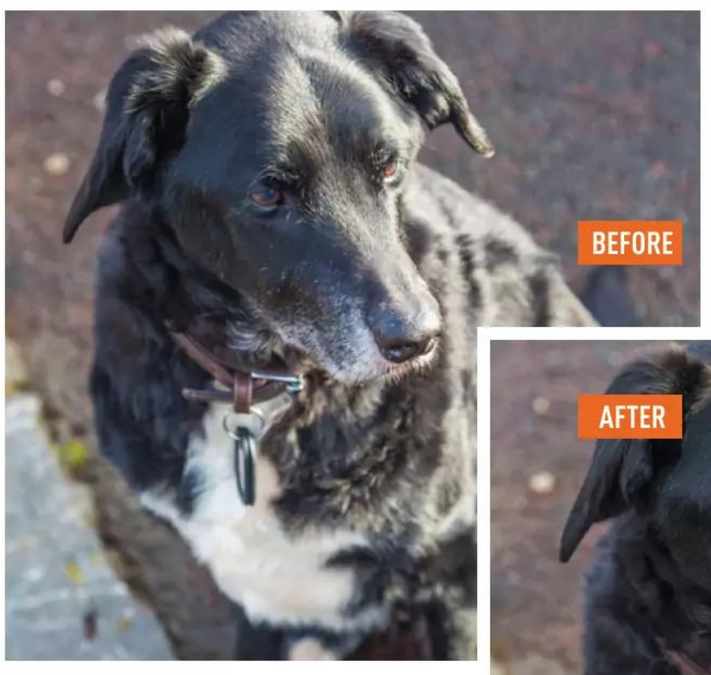
Although modern optical coatings for digital lenses have surpassed Skylight and UV filters, they can still be your front-line defence against dirt and moisture.

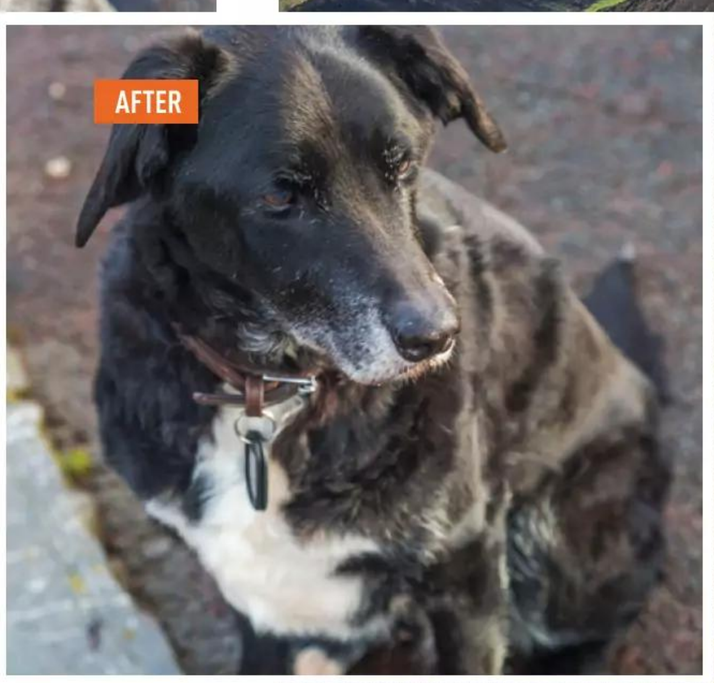
The polarising filter

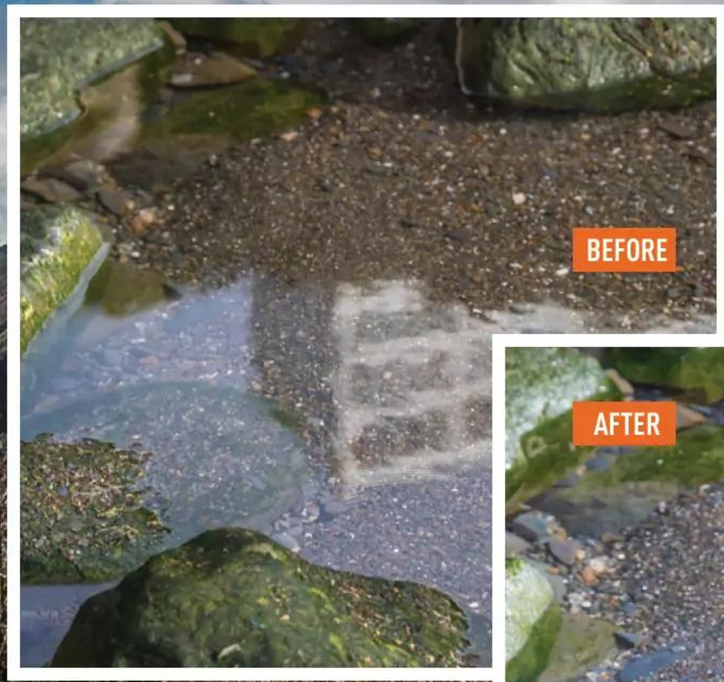
A circular polarising filter (CPL) is used to increase saturation and to reduce or eliminate certain reflections or glare in non-metallic surfaces. Round CPL filters come in a rotating mount and screw onto the front of your lens; you simply set up your camera settings as desired and frame the shot then, as you rotate the CPL in its mount, you will notice that certain reflections from objects like water or glass will appear and disappear as you continue to rotate the filter, you'll also notice an increase in saturation. The CPL is also used to darken blue skies on sunny days and if there are white clouds in the sky, the contrast between blue sky and white cloud will increase as the blue darkens, by a substantial amount. It's important to know that for a CPL to work at its best, you really need to have the sun coming in at right angles, either from your right or left side.

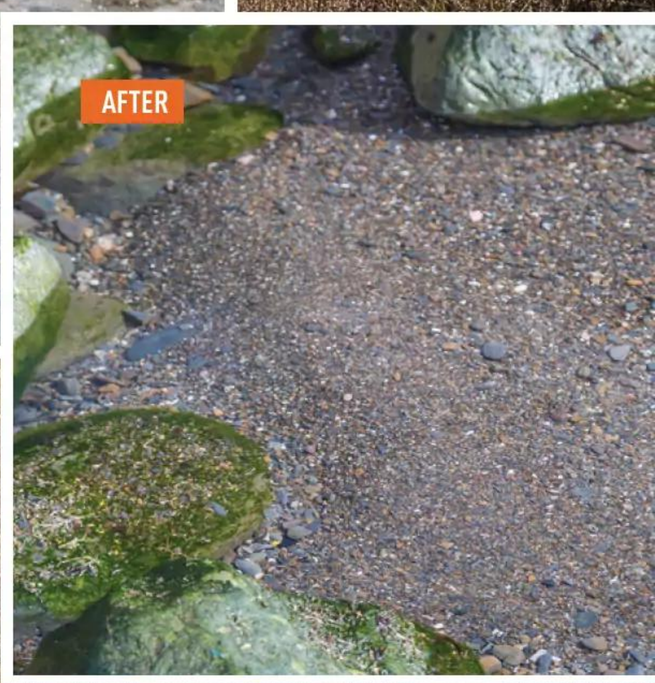
In the majority of cases, CPL filters are round screw-on types, however there are also some square filter versions available, such as the Cokin X Pro system and Lee 100mm system, it is still a circular filter but it sits in the filter folder frame and can be rotated like its screw-on cousin. One thing to be aware of is that they do not come cheap in fact a Lee CPL, for their 100mm square filter holder system, is around £200 ($245).

Some of the typical uses for the polarising filter are shown here. From darkening blue skies, to the reduction or elimination of glare and reflections in non-metallic surfaces.







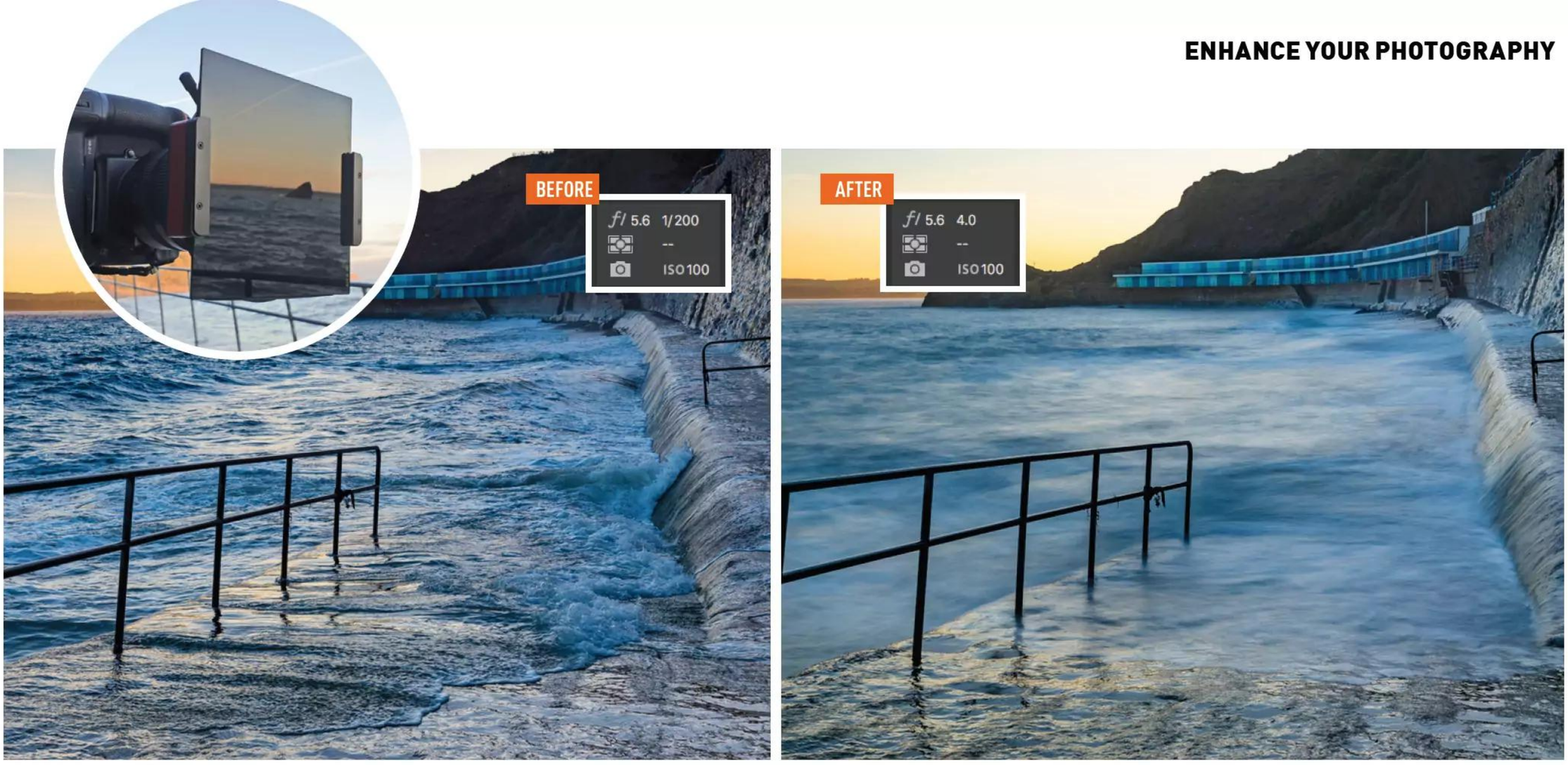


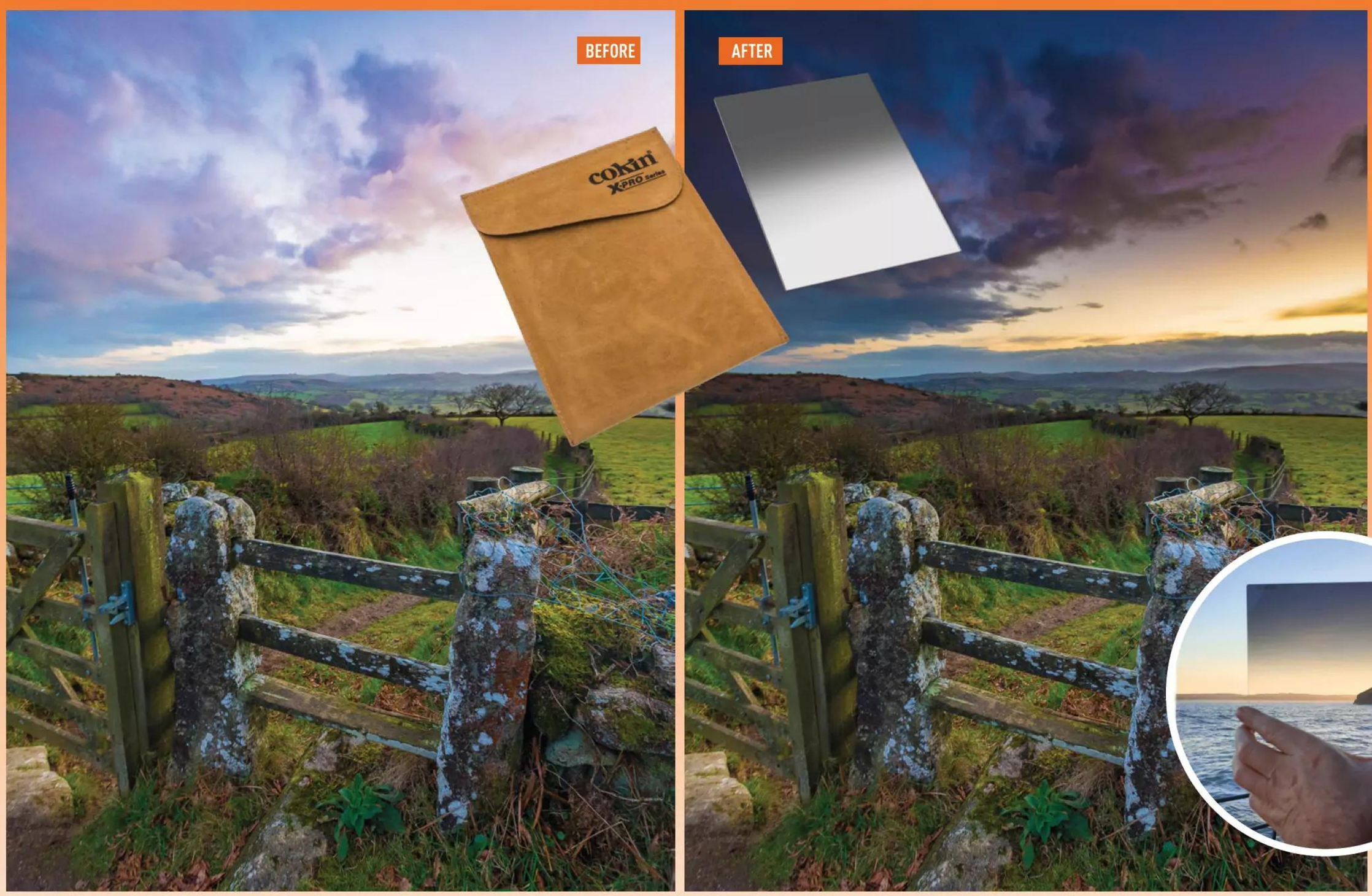
Neutral density filters

These filters, commonly referred to as ND filters, are essentially pieces of dark grey glass or resin, the neutral grey avoids imparting any colour cast onto the image and depending on how dark they are, these dark grey filters reduce the amount of light falling on the sensor. As a result, you are able to use much wider apertures and, if required, achieve a much shallower depth of field on very bright days. You can also use them to drive up exposure times while employing the creative application of blurred movement, such as waterfalls shot over many seconds, to reduce the water to a white mist.

ND filters come in a variety of densities denoted by their ND number. For example, a 1-stop ND filter is called an ND2, whereas a 2-stop filter is called an ND4, 3-stops is ND8, 4-stops is ND16 and so on. They come in round and square formats since they don't need to move and the most popular ones, for general lighting conditions, are usually the 2, 3 and 4-stop filters, but you can also get ND1000 filters that can reduce light by 10-stops.

The moving clouds on a bright sunny day are softened considerably after the addition of a 10 stop filter drives up the exposure time into several seconds.





Graduated ND filters

Graduated ND filters behave in a similar way to their standard ND filter siblings, but rather than being a solid grey all over, they fade from dark grey at the top of the filter to clear at the bottom. This transition, from dark to clear, is very effective at balancing the exposure in a scene where you have a bright sky and a darker foreground. Landscape photographers love this filter as it helps to remove the necessity for shooting more than one exposure of a given scene, which is normally done in order to get a well-exposed foreground and a well exposed sky, then blending them together. Like the solid ND filters, they come in various densities and different transitions between the dark and clear areas; you can get ND graduated filters that transition very sharply from dark to clear, over a very short distance, and are good for landscapes where the horizon is free of any obstructions alongside ones that transition very gradually, over a larger distance, for shots where there might be trees or hills in the frame.

For most landscape work, a 2-stop ND grad is enough to keep the sky from overexposing, but if you are looking to shoot bright sunsets and sunrises, then a 3-stop ND grad may be more effective at balancing the overall exposure. Although you can get round screw-on ND filters, they can't be moved, so it usually easier to get the square filter equivalent so you can move it up or down in the holder allowing you to place the graduated part of the filter exactly where you want it.

HOYA 77mm INFRARED (R72) MADE IN JAPAN
BEFORE
f/ 11.0 1/200
--
ISO 200
AFTER
f/ 11.0 233.0
--
ISO 200

Infrared filters

Infrared (IR) filters for colour IR photography, are probably the most specialist of all the ones we've listed here, but they can also produce some of the most eye-catching images. An IR image out of the camera looks quite odd, blue skies are a dark bronze colour while green foliage is a milky blue colour, but after processing, they take on a surreal look that many favour. IR filters allow us to capture scenes in ways that conventional photography does not, they only allow certain wavelengths of light that are invisible to the naked eye to be captured by your cameras sensor. The human eye can only see light between 400 - 700nm (nanometers). A good filter to get going with, is an R72 filter that cuts out light up to 700nm, bear in mind these filters are incredibly dark, so long exposure techniques will come into play here.

Be aware that you may be shooting exposures lasting up to a couple of minutes with certain cameras. Some are better at capturing IR images than others, due to the fact that DSLRs have an IR filter that is designed to cut out these wavelengths to a certain degree, ensuring good image quality. Some camera's IR filters are stronger than others so you might need to check you own camera's IR capability before you start. IR filters come in a number of varieties from 850nm, 720nm, 665nm and 590nm. They are round screw-on filters and can be purchased in different thread sizes.

There you have it. That's our roundup of some of the most useful filters we think any photographer should keep in their gear bag. Shut down Photoshop for the time being, get yourself a couple of filters and enjoy being in full control of your camera and the light you're using to create great photos. ■

Plants and flower photography

Take it easy with some relaxing plant-based still life

As your photography evolves, you will no doubt be trying out various types of subject matter and getting involved in photo shoots with people, animals, children and the like. You may also be working at larger events, functions, or even weddings, where you are herding people around and generally having to be in charge to get the shots required by your client. Having been in the thick of it, you can be forgiven for occasionally wanting something a little less wearisome. We can't speak for all photographers, but now and again, we believe it is quite therapeutic to grab your gear, head out and photograph something for yourself, just for the sheer pleasure of it. No moving targets, no groups shots, no shouting to make yourself heard at a function, and trying to catch the eye of subjects who would rather pull out their phones and tweet or talk to someone off camera, while you are trying to photograph them. To keep you sane, why not find a willing subject who will sit for you, never complain, and stay in the same position as long as you need? So it is then, that plants and flowers are your go to guys for a little photographic rest and relaxation. Don't think they are a walkover though. There is a lot of useful techniques to be learned when it comes to shooting flowers and we have some top tips to get your subjects looking their best.

Tripod first

Normally, we would start with cameras and lenses, but in this case, we first want to talk a little more about tripods. At the risk of sounding like a stuck record, we would always recommend that after your camera and lenses, a tripod should be your next purchase. Don't risk losing shots to camera shake by deciding that the purchase of a tripod is not worth the expense. We guarantee that it will become one of your most essential bits of kit and you'll wonder how you ever managed without it. Cheap tripods may prove to be a false economy here, since you will need to get one that has legs that can unlock and spread out wide, dropping the camera very close to the ground. Even better is a tripod that has a removable centre column, which can be reversed and positioned underneath the tripod, rather than on top of it. This flexible arrangement allows you to position your camera much lower to the ground and get you that much closer to your plant and flower subjects.

"Now and again, we believe it is quite therapeutic to grab your gear, head out and photograph something for yourself, just for the sheer pleasure of it."

Cable release

If you're thinking about tripods and why they are useful, then also consider a cable release. They let you fire your camera without the need to touch it. They can be connected directly to the cable realise port on your camera if it has one, or you can even get radio controlled options that are cable free, with a receiver connected to the camera and a transmitter that you use to fire the camera when needed. Setting up your tripod and camera with a cable release avoids the need to touch your camera and possibly cause it to shake as the shot is taken.

Camera and lens

The camera, in this case, is not the most critical aspect for successful plant and flower photography. A 12MP camera is not going to be much different to a 21MP camera if the lenses they use are not up to the task. Even humble point and shoot cameras can be just as good at shooting these kinds of subjects, if their built in lens can provide the right focal length and close focusing ability.

Luckily, modern point and shoot cameras have a macro mode that allows you to get in relatively close to your subject and fill the frame more than in standard shooting mode. It also sets up the camera to use as wide an aperture as the lens will allow, so you can eliminate background distractions. Typically, point and shoot cameras have a built in lens with a range that is roughly equivalent to a 28mm - 135mm zoom lens.

Other slightly more advanced cameras, such as bridge cameras, may still have a built in zoom lens, but you also have the option of adding macro and wide angle filters to the front element, therefore adapting the lens to more specific needs. In the case of our plant shoot, a macro filter will work well to get you closer to the subject. Even mobile phones have clip on lenses that allow you to turn that tiny fixed focal length lens into a wide-angle lens, a zoom lens, or again, a macro lens.

Once you step up to interchangeable lens systems, your choices do increase, but so, too, do the prices. Any compact system camera or DSLR will have a number of dedicated lenses covering the gamut of wide-angle to telephoto, as well as specific glass, like tilt-shift lenses and macro lenses.

You can use any number of lens types to shoot your flower photographs, depending on your creative needs. A telephoto lens will let you pick out a solitary flower, while having the aperture wide open will keep the background out of focus and reduce annoying visual distractions. A wide-angle lens will let you capture an entire meadow or forest at around the 16mm - 24mm focal length, but can still let you get in relatively close, whilst allowing a lot of the surrounding plants to still be seen in the shot, if you so wish.

If you want to get in very close and fill the frame entirely with your subject, then you will need a decent macro lens. They let you focus very close to your subject and most good macro prime lenses offer a maximum aperture of f/2.8. A 50mm macro will probably require you to be so close to the subject that your own camera and lens may cast a shadow. 100mm and 200mm macro lenses will still let you fill the frame, but you can position yourself further away from the subject.

From compact cameras using macro mode, to interchangeable lens cameras, macro filters and top of the range 200mm macro lenses. There is nothing to hold you back in the pursuit of your subject.

Use a short focal length lens and shoot wide, or grab a macro lens and fill the frame with your subject. The creative choice is yours.

Your plant and flower images can be as classic in their composition as you like, or a little more abstract if you prefer something a little more off the wall.

Pick your plant

Now you are armed with the gear you need, it's time to set off in search of some suitable subjects. In the natural world, you are spoilt for choice, but there are a few things worth bearing in mind as you search. It makes sense to pick out the best flower that represents its species. Flowers or plants with dead or rotting leaves don't make for great photos. Check for signs of predation by insects, blemishes, imperfections and any other clutter or debris that may spoil your shot. Try not to just plonk yourself down in front of the subject and shoot straight away. Look at it from different angles and move around it. Find the best vantage point before you commit. Keep and eye on distracting elements in the background as you compose the shot. Also make a note of how shadows interact with it and also the shadows cast by the subject itself.

Composition

The composition of the image will come next and it's worth taking your time over this. A key ingredient with close-up work is just how much of your flower is in focus. The urge may be to have as much sharp depth of field as possible, but at those close distances you may find you're pushing your apertures up to f/16, and greater. Your shutter speed durations will increase dramatically and, even though your camera is set up on tripod, you run the risk of the flower moving. Even the slightest breath of wind may cause tiny movements in the subject that can ruin the shot. The alternative is to open up your lens and use larger apertures. This gives you much shallower depth of field, so you need to be certain of your sharpest point of focus within the shot. Also, as a by product your backgrounds go out of focus, so you get that nice blurred effect and there are less visible distractions. Speaking of point of focus, it is recommended that once you establish the part of your subject that you want to be sharpest, putting your lens into manual focus mode will prevent it from accidentally refocusing on something else. Movement in macro shots is your enemy. Even a tiny movement will throw everything out, so keep it all locked down as much as possible.

Don't be afraid of experimenting with different perspectives. A short flower, close to the ground, could warrant a top down shooting angle. A flower or plant with a tall stem could look interesting if shot with a wide-angle lens from below looking upwards. Vary the apertures you are using and keep an eye out for any insects or other creatures that are interacting with the flowers. Bees, butterflies, and beetles can add a little visual interest to the shot. If the breeze is moving the flowers, try securing the plant with string or perhaps putting up some bits of cardboard either side to act as baffles to eliminate the wind. A cold night may result in dew forming on plants the next morning. Take yourself out at sunrise and see if there are any plants covered in dew, or the fine tracery of spider webs.

Light

The type of light in your shots will play a key role in their ultimate success as an image. The kind of hard edge shadows that occur in bright, midday sunshine are not conducive to great photography. The kind of light you encounter at the beginning or end of the day is much more flattering to plants, flowers, and humans come to that! The 45 minutes or so before sunrise, and same after the sun has set, offers much lower contrast light that can enhance the look of the shots dramatically. Many photographers will opt to shoot warm coloured plants and flowers after a particularly red sunset, whilst the cooler tones encountered before dawn can benefit flowers with blue, purple and lavender hues greatly. Cooler toned plants can also be shot on bright, but overcast days too. Try to avoid direct sunlight. Shooting in shaded woods, or using a thin white sheet to diffuse the light, will pay dividends in the final result. A piece of white card can also be used as a reflector to bounce light into shadow areas of your subject and opening them up with a bit of fill light.

The photographs above are good examples of using the right light for the right subject. Blue flowers look great in overcast or cool lighting conditions, whereas red, orange, and yellow flowers come alive in warm light.

Your turn to relax

Go on; treat yourself to a photo shoot that has no client except you. Grab your gear and just get lost in the fun of shooting what you want, when you want, how you want. Flowers and plants are always on hand to pose for you without complaint, or the need for payment and model releases. Enjoy. ■

Astrophotography with your digital camera

Some handy information about shooting the night sky

Shooting the night sky is not just the reserve of astronomers and large telescopes. Although you are not going to be imaging deep-sky nebulae and planets in extreme close-up, there is still plenty of scope for any photographer to create memorable and creative images of the night sky. It is a fascinating subject and with care, you can produce some stunning images of the heavens with just a digital camera, a tripod, and perhaps a useful app on your phone. Your options include twilight images, and photos of the sky long after the sun has set. Not only that, you also have some options to capture the stars in creative ways too. Have you ever wondered how you can capture the movement of the stars and turn the night sky into something that looks like the stargate sequence from the end of 2001: A Space Odyssey? Well, we have information that can help you on your way to capturing the majesty of the cosmos in work that looks really cool as well. With some basic equipment, and some easy to understand techniques, you too can explore the wonders of the universe and capture the moon, stars, and our own Milky Way galaxy this very night, if you wish. Let's get started and talk about cameras first.

"It is a fascinating subject and with care, you can produce some stunning images of the heavens with just a digital camera, a tripod, and perhaps a useful app on your phone."

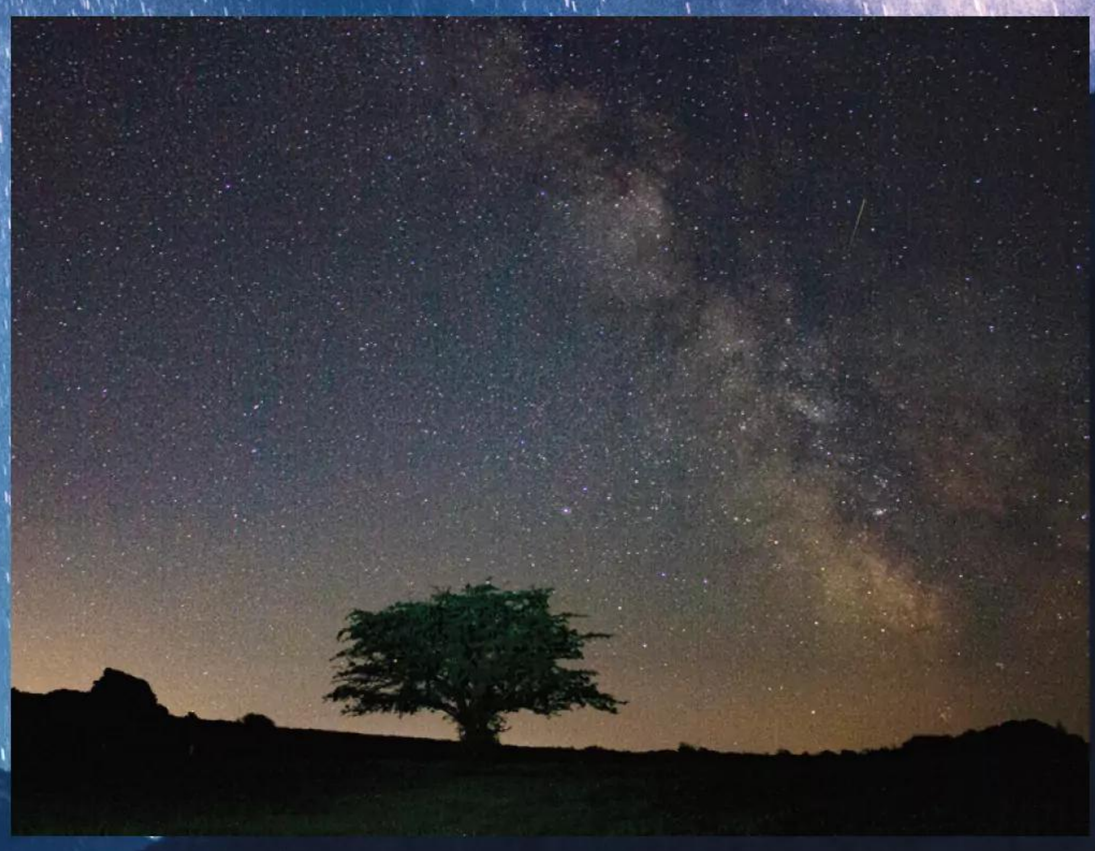
Which camera?

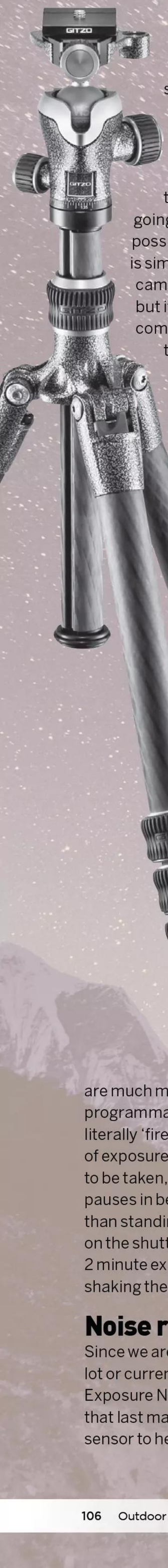
The gear you need is relatively simple. Your camera can be anything from a DSLR or bridge camera, down to a compact camera. You may find you need to be able to use manual settings, purely for the sake of image consistency, and it also helps to be able to shoot in Raw format although it's not a deal breaker if it can't. We mention Raw with annoying regularity but it is with good reason. Raw images, as the name suggests, is the data captured from the sensor with no compression or processing of any kind applied to it. It is literally raw and untouched sensor data. This gives you the absolute best original image quality to be working with as you get into the post-process stage of editing your photos, whether you are eking out as much detail as you can from a landscape photo or, in this case, making the night sky look its absolute best. If your camera also supports mirror lockup, then use it. Mirror lockup moves the mirror out of the path of the sensor before the exposure starts to reduce the chance of vibration causing a loss of sharpness. People do argue that it really has little to no impact on the resulting sharpness and if you are using a big, heavy tripod, that is more than likely. If however your tripod is not so sturdy, then it may still be worth using this function.

What lens?

The night sky is a big place. It encompasses from one horizon to the other and to do it justice, a wide-angle is normally the lens of choice. Wide-angle lenses in the 14mm - 28mm range are considered wide angle enough for the task. If you have a camera that has a lens with a focal length in this area, you should be good to go. Don't discount your choices if you have a compact camera with a built-in lens that has a longer focal length than this.

You could still get some great shots with an equivalent 28mm lens or longer, but your field of view would be much narrower than with its wide-angle brethren.





Sky shots generally need that wide field of view so you can capture a large amount of sky, as well as some foreground interest such as mountains or trees.

Keeping it steady

If you want great, steady, shots of the sky, you will need a tripod. You are going to be dealing with exposure times possibly in the tens of seconds. Hand-held is simply not an option. You could rest your camera on a rock, or other sturdy base, but if you want proper control over your composition, it's going to have to be a tripod or nothing. Let's face it, if you are serious about your photography, you will have a tripod anyway.

When shooting long exposures, the sturdier the tripod the better. A bigger, heavier tripod may be a pain to cart around with you, but it will keep your camera steady as a rock through those all-important exposures.

Cable release

Another useful item is a cable release. Back in the day, a cable release was a very simple affair. It was a bulb connected to a tube with a plunger at the end that you screwed into the shutter release button of older cameras. Squeezing the bulb pushed the plunger into the shutter button, firing the camera. That is where the term 'Bulb Mode' comes from when talking about using long exposures that range from 30 seconds to minutes, or even hours.

These days, cable releases are much more complex beasts. They are programmable in various ways that allow you to literally 'fire and forget'. You program what length of exposure you want, how many shots you want to be taken, and the amount of time the camera pauses in between each shot. This is much better than standing there in the dark with your finger on the shutter button, holding it down while a 2 minute exposure counts down and possibly shaking the camera in the process.

Noise reduction

Since we are talking about long exposures, a lot or current cameras offer what is called Long Exposure Noise Reduction (LENR). Exposures that last many minutes can cause the camera sensor to heat up. This heat can generate additional noise that can degrade the quality of the image. When you take a shot with LENR active, the first normal exposure is recorded, and then it shoots a so-called 'dark frame' that is the same exposure duration as the first. It records the amount of noise caused by the heat of the sensor and it uses this frame to cancel out noise in the first normal exposure. In practice, people argue that it is not worth the effort of having to wait 10 minutes for your first exposure, for example, and then wait another ten for the LENR frame to be recorded. You could literally be there all night! You may be better off keeping LENR disabled and using more effective noise reduction options at the post process stage.

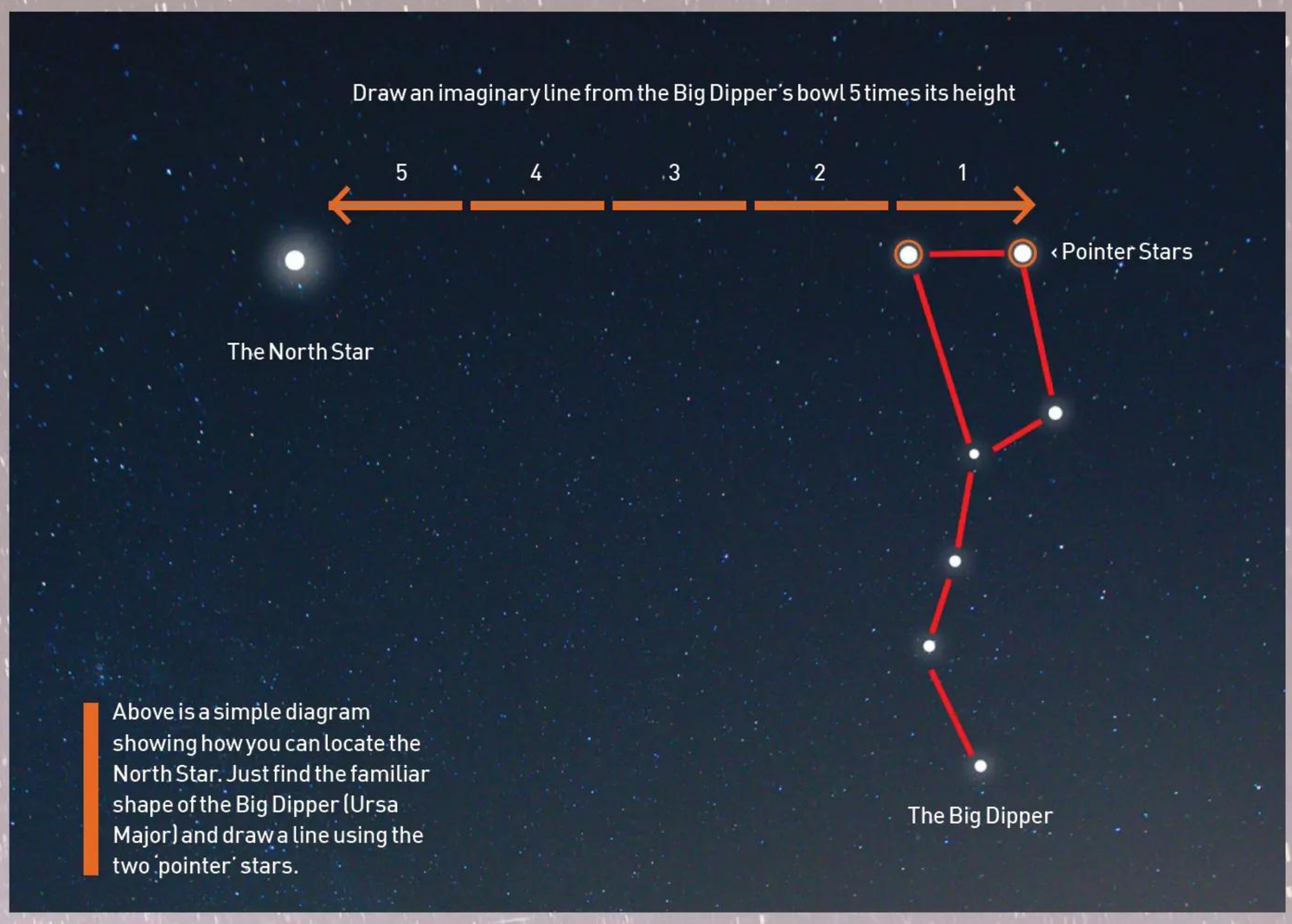
Long or short exposures?

As you prepare for your shoot, one thing to consider at the outset is what kind of pictures you are hoping to capture. If you are looking to shoot the sky and keep all the stars as well-defined points of light, then you will need to shoot relatively short exposure durations so the movement of the earth does not transform the stars into smeared light trails. Of course, if the reverse is true and you do want to capture long star trails, then you are not as constrained by your exposure time. Later in this article, we have two examples of night sky images. One is a typical star trail photo and the other is a capture of the Milky Way. We will cover each one in a bit more detail shortly.

The humble cable release has evolved over time. Now, it is a small programmable device often referred to as an intervalometer. It can control your camera's exposures so you can adopt a hands-off approach.

Composition

This is once again down to personal preference. Portrait and landscape orientation works equally well. Obviously, portrait orientation means you can see more of the sky vertically up from the horizon but the broad sweep of a landscape shot is just as good. The only time portrait orientation is preferred, is when trying to capture the polar star Polaris. Also called the North Star, this is the star that doesn't move through the night sky as the earth turns. Shooting a star trail with the North Star in the frame means you will capture an image that looks like a giant pinwheel, with all the other stars rotating around the one point. The North Star can be found at the end of the handle of the 'Little Dipper' (Ursa Minor). You can also use the two stars on the farthest side of the bowl of the 'Big Dipper' (Ursa Major) as pointer stars. Draw an imaginary line that connects the bottom of the bowl to the top of the bowl, and then extend that line outwards about 5 times the height of the bowl until you see a much brighter star. That is Polaris.

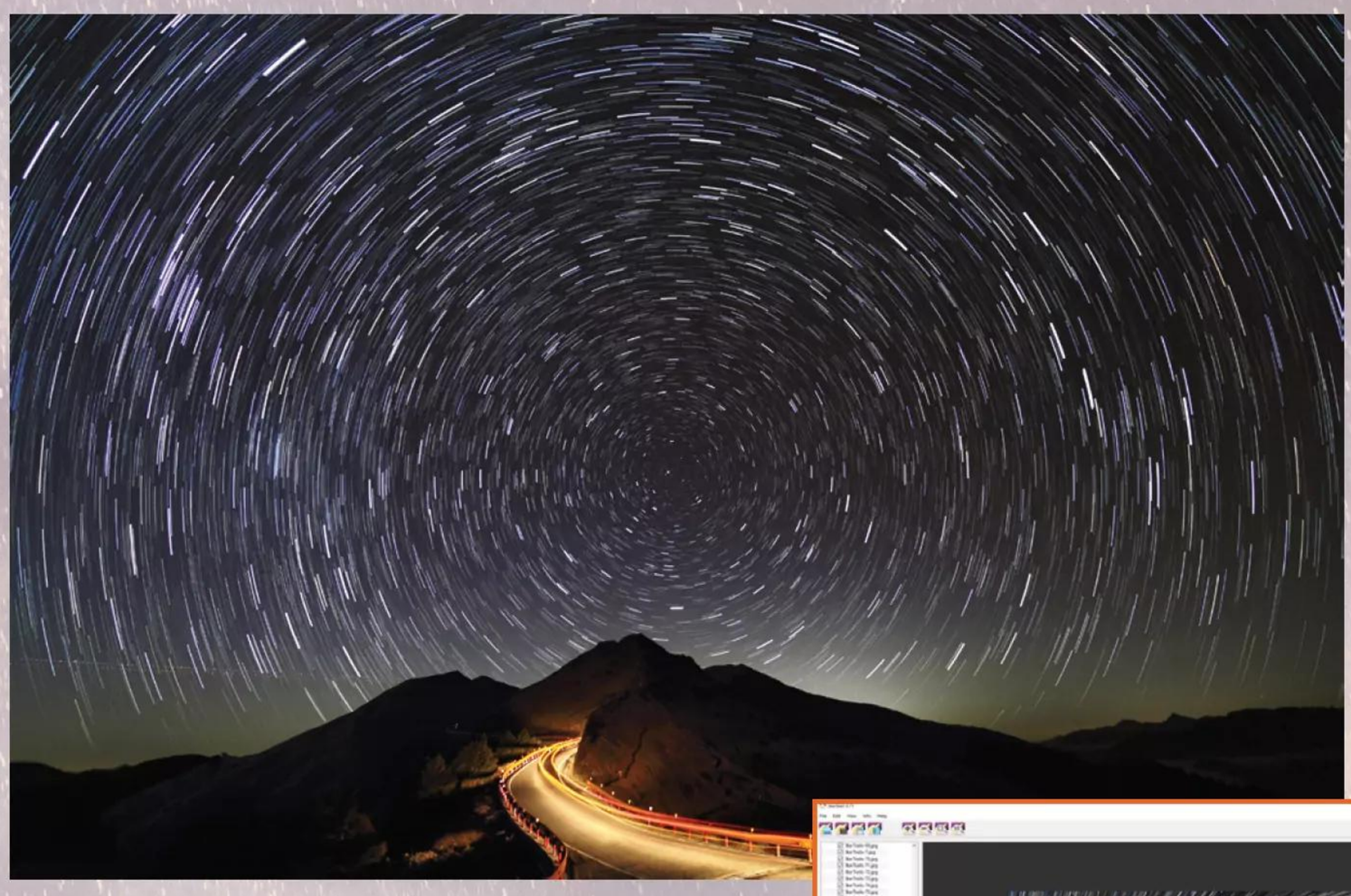


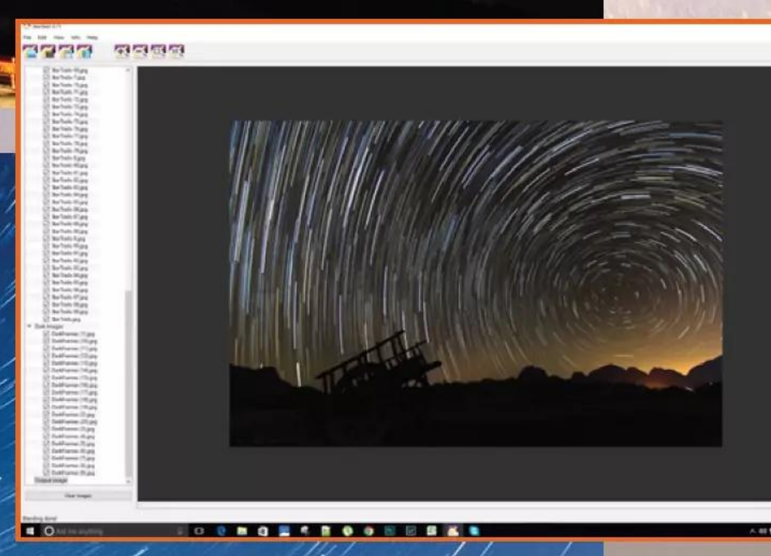
Above is a simple diagram showing how you can locate the North Star. Just find the familiar shape of the Big Dipper (Ursa Major) and draw a line using the two 'pointer' stars.

Star trails first

There are two methods that can be used to capture star trails. The first is to shoot one long exposure. This can range from 10 minutes up to 30 minutes, and in some cases even longer. Prevailing weather, light pollution, and the phase of the moon will have an impact on the exposure time. If the moon is bright, you'll need to be careful; it will put a limit on your exposure times as its ambient glow will start to overpower the stars. A black, moonless night will let you shoot very long exposures to capture the movement of the stars with enough starlight to illuminate your environment. Obviously, you don't want to do an hour long test shot only to find you are using the wrong settings. A great method to get a test shot, taken in a reasonable amount of time, is to bump the camera ISO up to its maximum and shoot wide open, with your lens' maximum aperture. Once you have a balanced exposure, you can use those settings to calculate how the settings should alter to keep the same balanced exposure if you take the ISO down to 100. Luckily, there are plenty of apps available for your phone that can do those calculations for you. One tried and tested app is Expositor. It has been around for a while now but it does a great job.

The alternative to shooting one exposure over a long enough period of time to register movement, is to shoot much shorter exposures with settings that capture the brightness of the stars, without showing movement, and stack these images together. You can use Photoshop to do exposure stacking or you can use software such as Image Stacker, DeepSkyStacker, and StarStaX to automate the process for you. Alternatively, the short exposure approach is different, but for many, it is the preferred way of doing things. This time you need to get some balanced settings that give you a much shorter





A clear night on Dartmoor, with the craggy rocks of Hound Tor in the foreground, provide the elements needed for another star trail image sequence. Shot with a Nikon D810 and Tamron SP 15-30mm f/2.8 lens.

Here's an example of another single frame from a star trail sequence looking across a small lake. The reflection of the stars in the water gave us an extra visual bonus. Shot with a Canon 5DMK3 and 16-35mm f/2.8 lens.

exposure time, but shows the stars clear and bright with as little visible movement as possible. This usually means an exposure time of 30 seconds or less. This is where the large maximum aperture of f/2.8 mentioned before comes in handy. It means you can get shorter exposures at f/2.8, with lower ISO settings than if you had a lens that had a max aperture of f/4 or f/5.6. With the camera settings ready, you need to shoot a sequence of images over a period of time that replicates a single exposure of, say, 30 minutes to an hour.

One clear evening, with no moon in view, we set out to capture some star trails. We were armed with a Canon 5DMK3 and a good EF 16-35mm f/2.8 wide-angle lens. We had a robust Manfrotto tripod and an intervalometer to automate the shooting process for us. In addition, as we were going to be trudging around at night, we had stout shoes and warm clothing including hats and gloves. Clear nights can get cold in the UK and we knew we would be sitting around for many minutes

The inset image shows a basic exposure taken without the aid of any light painting to illuminate the rock. The main image below shows how the shot transforms with some simple torchlight from the right of frame.

at a time waiting for the exposures to finish. Last, but not least, was a powerful head torch so we could navigate the dark environment easily. We found a spot that we knew faced due north. We found Ursa Major and used it to pinpoint the North Star. Our composition was set up to include the North Star in the shot. A few test shots revealed the best settings of aperture f/2.8, bulb duration of 30 seconds, and ISO 1000. The intervalometer was set to fire the camera and take 30 shots using those settings. The lens was manually focussed at infinity, and the button was pressed. 15 minutes later, the sequence was done. We then moved location to the side of a small lake, and set up a composition that would show the stars reflected in the lake waters. The settings were almost the same as before, apart from boosting the ISO to 1600, as it was nearly pitch black. Another 30-shot sequence was captured.

The Milky Way

Having captured some stunning star trails, it was time to try something that we had not attempted before, but had always wanted to. Getting shots of the Milky Way is not difficult, but it does require a bit of planning and forethought to get some nice examples. You need to know where the Milky Way is going to be in the sky, what elevations you are dealing with, and also what times it will be visible. Luckily, there are plenty of apps that can tell you. A personal favourite of ours is PhotoPills. It is a very feature rich app that's capable of everything from calculating hyperfocal distances and planning sunrise and sunset shoots, to exposure guides and, in this case, Night AR. This feature allows you to view a scene on your mobile

device in real time, and overlay the positions of stars, the sun and moon and most usefully for us; the Milky Way. This meant we could see in advance, where the Milky Way would be during the best hours of darkness, later that night. Therefore, we knew where and when we needed to be ready. Midnight saw us arrive at Haytor Rock in Devon with our camera kit. This time we were armed with a Nikon D810 and a Tamron 15-30mm f/2.8 ultra-wide angle lens, as well as some torches, in case we wanted to try some lighting painting too. We set ourselves up with the granite tor as our prominent foreground item and, since the sky was clear and there was no light pollution, we could easily make out the Milky Way splashed across the sky. This allowed us to set up our compositions accordingly to combine the rocky tor and the starry sky to best effect. Once the composition was set up, we needed to figure out settings to capture the stars without motion blurring them. There are a couple of equations that photographers can call upon.

The 500 and NPF rule

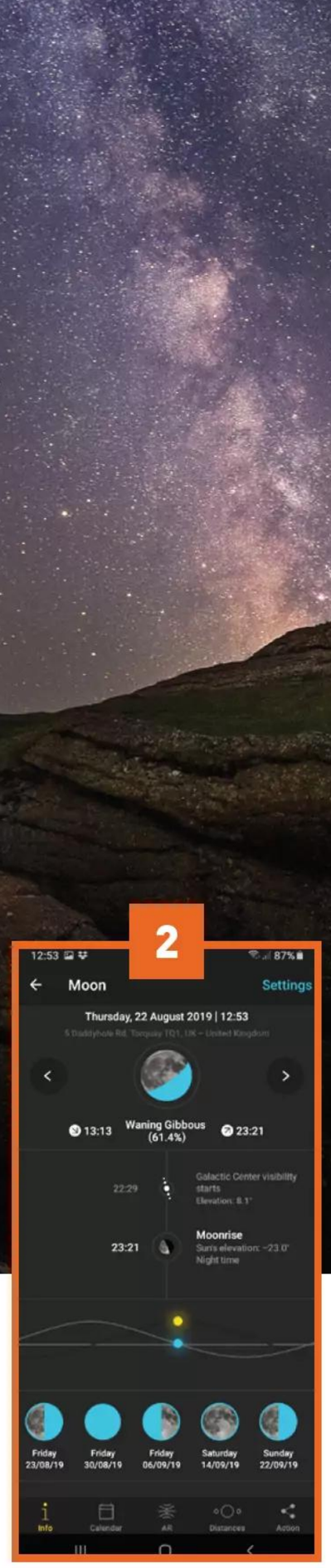
The 500 rule was originally developed for a full frame film camera and requires you to set your camera to ISO 3200, Aperture to f/2.8, and shutter speed to 500 divided by the focal length of your lens. For example, if you were shooting with a 50mm lens, your shutter speed would be 10 seconds (500 / 50 = 10). Many would advocate the use of the newer NPF rule which is a much more complex equation, but takes into account the better quality imaging technology on offer today. Apps are available that calculate the maths for you based on the camera you are using.

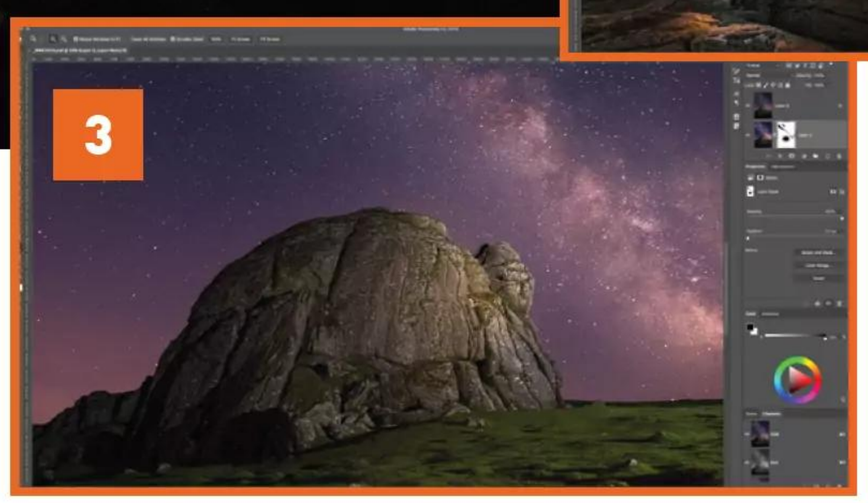
We decided to go with the easier 500 rule to begin with, and since we were using a 15mm lens, this would mean a shutter speed of roughly 30 seconds with the aperture at f/2.8 and the ISO set at 2000 for a decent exposure. Your focus for images of this nature require you to set focus manually at infinity, or to lock focus on a distant object and then set it to manual so the focus, once set up, didn't change. A few test shots showed that this was working well, and on the Nikon D810, even the ISO value of 2000 still gave good, clean, results. What was not working so well was our foreground interest. The rock looked dark and uninteresting. Since we had torches, we decided to try some of the exposures with torchlight being shone on the rock face from camera right. Suddenly the images transformed, and the granite tor looked far more interesting when lit from one side. We were able to come away that evening with some great images of the Milky Way, ready for processing back on the computer.

Post processing

So you have your sequence of images for your star trails and Milky Way shots, the next stage is to process them in your favourite Raw editing program. Adobe Camera Raw (ACR) and Lightroom (LR) are perfect for the job, but you may also have software provided by your camera manufacturer. The main thing to be aware of is to process your entire sequence all at the same time, so that you have consistency. Try not to be too heavy handed but make sure your stars are bright and clear. You can then save the sequence as a series of good quality jpegs or tiffs, ready to be stacked. The stacking sequence in Photoshop is relatively easy. You just need to load all the images as a series of layers into one document. Then make sure they are all selected and set the blend mode to Lighten. All the brightest detail will be merged and you will be able to see the path taken by the stars in one beautiful star trail.

The single Milky Way images can be processed to reveal maximum detail and then brought into Photoshop for any final finessing that you may require. With that, you now have two very different approaches to capturing the night sky. ■





PhotoPills (1 and 2) is a great app for all kinds of photographic endeavour and anyone looking to shoot the night sky will benefit from its various features. From moon phases to star trail creation and hunting down the Milky Way, PhotoPills has you covered. Back home on your computer (3 and 4), make sure you process your images with a deft touch and try not to overdo it.

Beaches, snow and very bright scenes

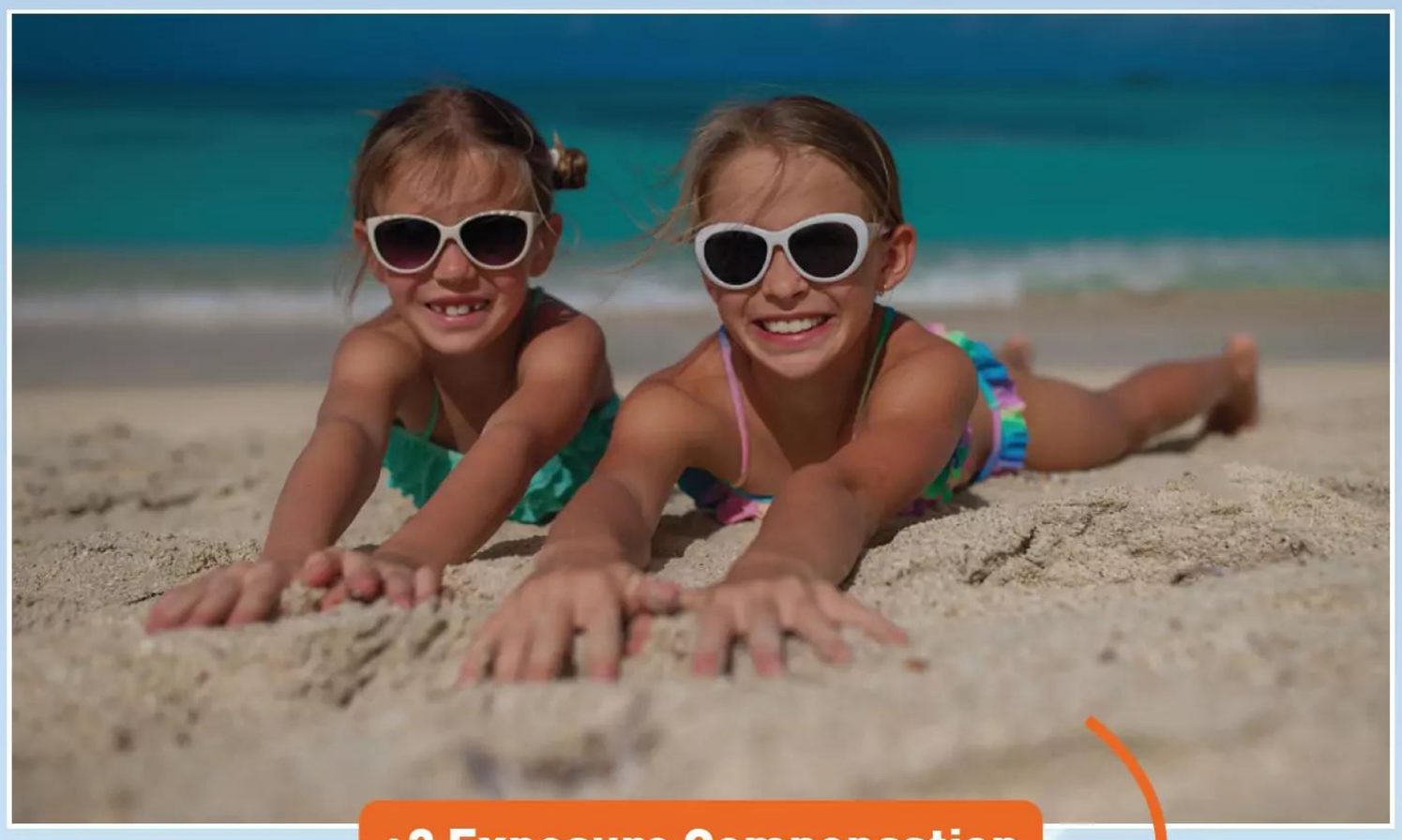
Very bright scenes can be an exposure nightmare

If you've ever taken a photo where most of the background was white snow, or bright white sand on a sunny beach, you've probably been disappointed by the results. That crisp, white snow comes out looking grey and murky, while your subjects come out looking very dark and under-exposed. There is a very good reason for this, and fortunately, it is very easy to correct.

The problem lies with your camera's light meter. It is designed to measure the light and set the exposure for an average scene and, under average conditions, it will normally do a very good job. This is because an average scene has an unusual property; it reflects approximately 18 per cent of the light falling on it, equivalent to a mid-tone grey. It doesn't matter if it's a landscape of rolling fields, a city street, or your own living room, the average amount of light reflected is always around that magic 18 per cent figure. Your camera's light meter is calibrated to take account of this fact, which is why it will produce the correct exposure in any normal situation. In fact, professional photographers will often use a special 18 per cent grey card to help make very accurate exposures. They will have their model hold the card, or place it in the scene to be photographed, and take a spot meter reading from the card.

"However good your light meter is though, it will start to have problems whenever it tries to measure a scene where the light reflection is different from the average."

You could be forgiven for wondering why scenes like the examples shown here could possibly give you exposure problems. The problem, as it turns out, is not the scene but your camera's metering system, as we will show you.



Compensate

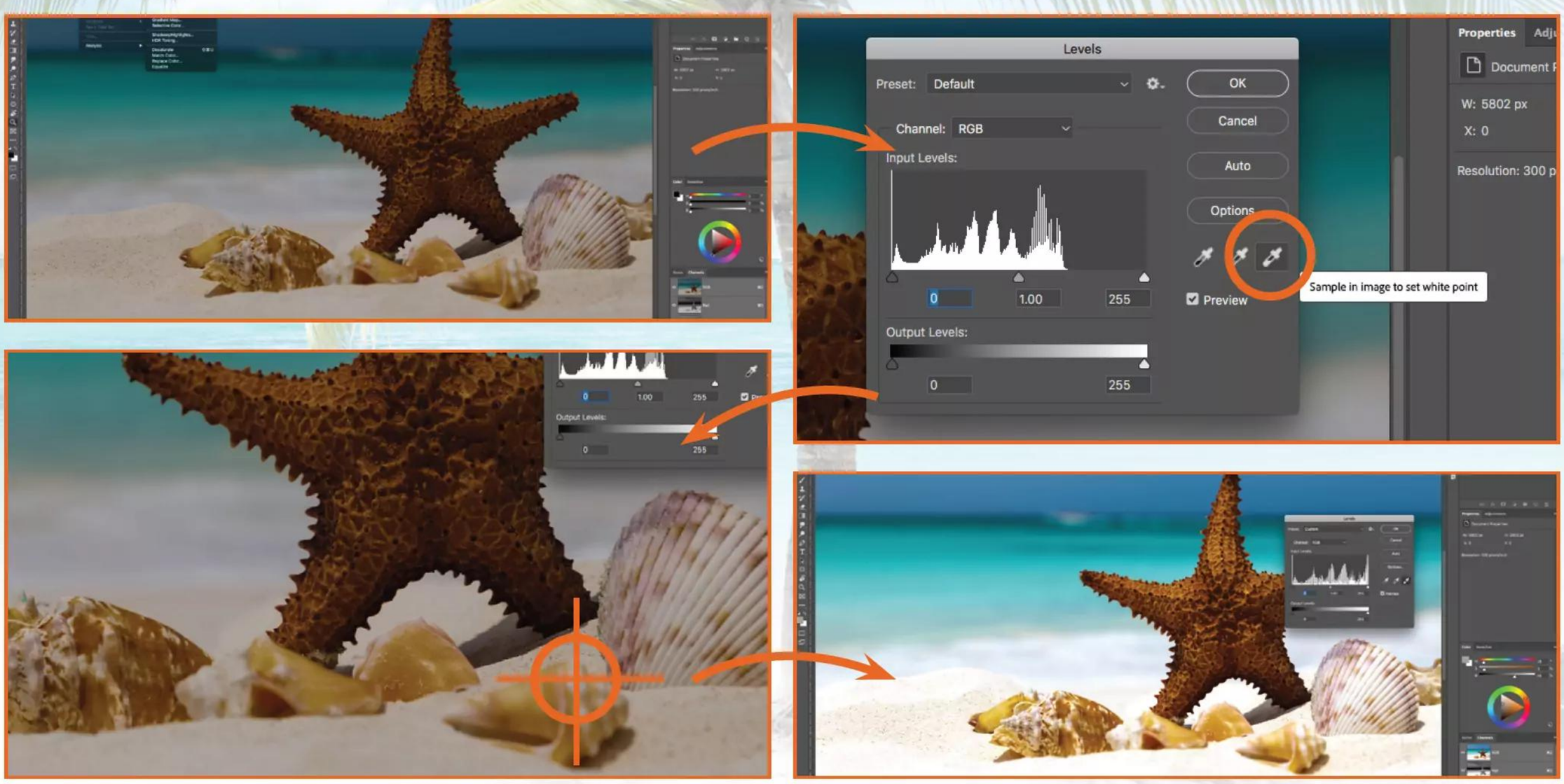
However good your light meter is though, it will start to have problems whenever it tries to measure a scene where the light reflection is different from the average, and snow/beach scenes are a prime example. The bright surface reflects much more than the usual 18 per cent of available light, but your camera meter doesn't know this. The light meter measures the light reflected by the scene, and assumes that it is supposed to be the usual 18 per cent. As a result, what was supposed to be white comes out as a mid-tone grey, and any non-white elements in the scene will be very under-exposed. We can correct this, to some extent, by using the exposure compensation feature found on all digital cameras. By adjusting it to +2 or +3, we increase the exposure and the brightness of the image, restoring the white background to white, and ensuring that our subjects are now correctly exposed. Increasing the exposure does have two potential drawbacks however. First, it usually means using a much longer shutter speed, which increases the risk of camera shake. If your camera has image stabilisation make sure it's switched on, and if you have a tripod or monopod, use it. The second problem is that of over-exposure, which could result in the snow or sand being completely burned out, leaving a plain featureless area of white in your picture. This is always a risk, so if your camera has exposure bracketing it is a good idea to make use of it.

A bright beach scene is a typical example of the kind of conditions that can fool your camera. The top example would have been taken with a default meter reading. Adding +2 stops of exposure compensation brings the next attempt up to a more accurate representation of the actual conditions at the time.

Very bright conditions, such as those encountered in sunny, snowy environments, will require even more exposure compensation. An example like this might even require up to +3 stops of adjustment to get a more accurate idea of the brightness in the scene.

Spot metering

Another good way to avoid this problem is to use spot metering, if your camera has this feature. It is a little more complicated to use than the normal multi-zone metering, but the results will often be much better. For most cameras, the way to use spot metering is to aim the centre-spot of the frame at the subject's face, half-press the shutter button to take a light reading, and then keeping the button half pressed, compose your picture and take the shot.



What if?

But what if you've already taken your photo, and it looks grey and dull as described above? Fortunately, it is quite easy to fix this using image editing software, especially a good package such as Adobe Photoshop, Photoshop Elements, or Corel Paint Shop Pro. The tool that can correct this problem is Levels, which makes fine adjustments to the brightness and contrast of an image. In Photoshop it can be found by using the keyboard shortcut CTRL + L (Cmd + L on a Mac), or in the Image > Adjustments menu. The levels dialogue includes three buttons for setting various tone points in an image, one of which is used to set the white point. Simply click on this button, and then click on any part of the image that is supposed to be white. The program will then adjust the brightness histogram to make that point white and, in the process, brighten up the whole image.

If you are feeling a bit more creative you can achieve much more accurate results, with usually less loss of detail, by manually adjusting the levels sliders. Move the left (black) slider to the right, and the right (white) slider to the left to equalise the histogram, then carefully adjust the mid-point slider to lighten or darken the image until the snow or sand is mostly white but with some visible details.

Shoot with confidence

Now that you have some insight into why certain photos always turn out different than expected in very bright lighting conditions, you can now approach these scenes with a little more confidence and get the shot right first time, every time. ■

The stand-in safari

A trip to the zoo can sharpen your photography skills

The excitement of photographing wildlife in its natural habit on the plains of Africa, or in the Congo basin is beyond all but the most intrepid and experienced wildlife photographers. The images captured can be breathtaking and unlock the wonders of natural world when presented to us on the covers of prestigious magazines such as National Geographic. Experience, funding, and some very specialist equipment is the order of the day for the top-level wildlife photographer.

"How is it possible to begin to develop the skills required when lions and elephants aren't exactly thick on the ground in the streets of your local town?"

How about the rest of us would-be wildlife photographers? How is it possible to begin to develop the skills required when lions and elephants aren't exactly thick on the ground in the streets of your local town? An excellent place to start, is at your local zoo. Agreed, it's not exactly the wilds of Borneo, but there will be a range of exotic creatures big and small that you can try your photographic skills out on.

The animals

If you think about it, the zoo is a great place to practice. It is a safe environment, and the animals are easily accessible. Obviously some animals, such as the primates, can only be viewed from a distance. In some cases, all that separates you from a cheetah, for instance, could be a single sheet of clear polycarbonate. However, in other cases, certain animals can actually be petted or fed directly, which gives you choices for some interesting close-up work too. Also, if the animals aren't presenting themselves for the camera, there is also that most entertaining creature, the human being.

The challenge

The zoo environment creates challenges that are not vastly different to capturing animals in the wild. You may have to shoot your subject from a distance. They may present a moving target and may be moving from a well-lit open area to more densely foliated areas. The rules of composition are still in effect, as is general photographic technique to ensure sharp, blur-free shots. There is also the additional challenge of the zoo itself. You will be shooting through cages or from behind glass and plastic, and you'll have to bear this in mind when composing your shots to make them look as natural as possible.

For our 'safari' we went to Paignton Zoo in Devon. We tried to keep our gear choice fairly minimal. We had an old 18MP Canon EOS 550D to which we attached a 100-400mm EF f/4 lens for an effective focal length of 160-640mm to give us a little more reach for shooting distant subjects. For the indoor low light enclosures such as the reptile house, we went with a Canon EOS 5DMK2 and a 100mm macro lens with a maximum aperture of f/2.8. This meant we could attempt to capture some nice close-ups of the creatures in their display cases. We would still have to shoot high ISO images but the wide aperture of f/2.8 gave us a fighting chance of getting some decent images at reasonable shutter speeds. We also had a sturdy tripod if needed for when slower shutter speeds no longer enabled hand held shooting. We also had a 24-105mm f/4 lens that we didn't use in the end. Topping it off was a good camera bag that could be slung over the shoulder and was not too intrusive while walking about.

1

2

3

4

The equipment

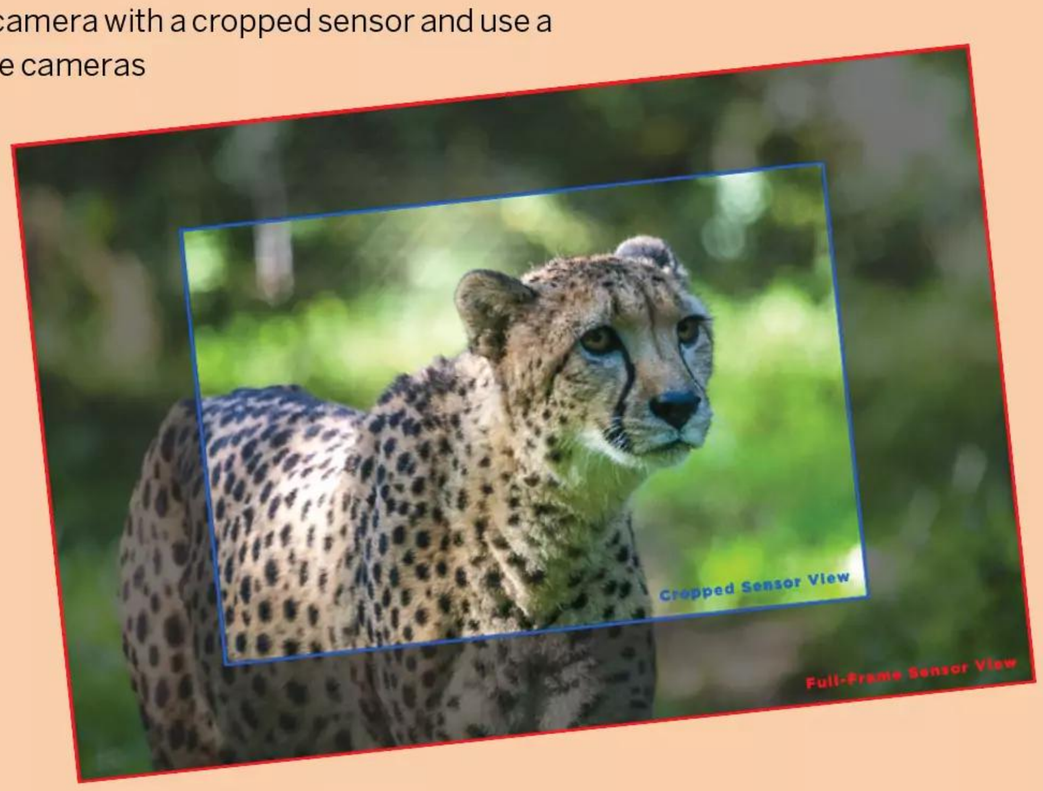
You are planning a trip to the zoo. What should your gear choices be? This will depend on your shooting style, but in the same way a landscape photographer will always have a wide-angle lens in their bag, a wildlife photographer will have a zoom lens. It doesn't mean you have to go out and spend thousands on a dedicated super-telephoto lens such as the Canon EF 800mm f/5.6 at nearly £10,000 **[1]**. You can actually buy a Korean super-telephoto 650-1300mm f/8-f/16 lens for £150 **[2]**. You would have to be aware though, that at this price-point, it is not going to be exactly world-class quality. Happily, there are other options. The current crop of super-zoom digital cameras are very affordable and offer optical zoom in the order of 30x to 80x magnification. The Canon PowerShot SX60 HS **[3]** has a 16MP sensor and a huge 65x magnification, which is comparable to a full-frame camera with a 24-1560mm lens. If you don't have a super-telephoto, you can always choose to crop your shots in your image editing software. The higher the resolution of your sensor, the more cropping power you'll have.

Double up

If you already have a DSLR with a medium telephoto in the 70-300mm length range, you could buy a focal length extender **[4]** and double the lens to 140-600mm. The big names like

The crop factor

Another option is to use a camera with a cropped sensor and use a lens designed for full-frame cameras on it instead. As an example, for some of the shots used in this article, a Canon EOS 550D was used with a Canon EF 100-400mm f/4 zoom lens. The lens is designed to project an image onto a sensor 1.6x larger than the one used in the 550D. The actual focal length of the lens does not change but the 100-400mm focal length range on the lens now appears as if it were 160-640mm.



Canon and Nikon offer these extenders for around £350, but you could always opt for third party brands like Yongnuo at up to half the price.

Get close

Now we have some options for shooting at long range. What about close-up? If you have a macro lens or your camera has a macro setting, then remember places like the reptile house or butterfly enclosure might allow you to get some interesting macro shots. In both cases, whether shooting at long focal lengths outdoors or shooting macro indoors with low light conditions, a tripod will be essential to keep your images free from motion blur. Be aware when moving indoors to a simulated tropical environment from a cold outdoor setting, that you risk your camera and lens fogging up when the cold metal and plastic of your gear hits the humid air of the much warmer enclosure.

When cold camera equipment meets warm humid air, the result is fogging of the lens and viewfinder and the chance of condensation build-up on your gear. If you can, make the transition between the two as gradual as possible. Some photographers have been known to put a cold camera or lens under their own coat in an attempt to warm it up a little before going into a humid environment.

Scout around

When you arrive at the zoo, it's generally a nice idea to walk around first and figure out where the best shooting angles might be for any given enclosure and when certain animal's feeding times might be. If you have to shoot through cages or bars, are there any apertures big enough to let you put the lens through so you do not capture any distracting zoo hardware in your shots? Failing that, shoot at your widest aperture for shallowest depth of field with the bars close to your lens and capture the animal at a point furthest from you and the cage you are shooting through. With a little luck, the cage will be out of focus enough not to distract too much. If you are shooting through glass, pick a spot where the glass is clean (or give it a wipe) and shoot square on through the glass, even pressing the lens hood against the glass to try and reduce as much unwanted reflection and glare as possible.

Eyes open

When you photograph a person, a key consideration is to get the eyes in focus to connect the viewer to the subject in the shot. That holds true when photographing animals too. Make your focus point the eyes of your subject, or the eye closest to you if they are at an angle. If you are photographing a smaller creature, get down to their eye-level if the conditions and enclosure allow it.

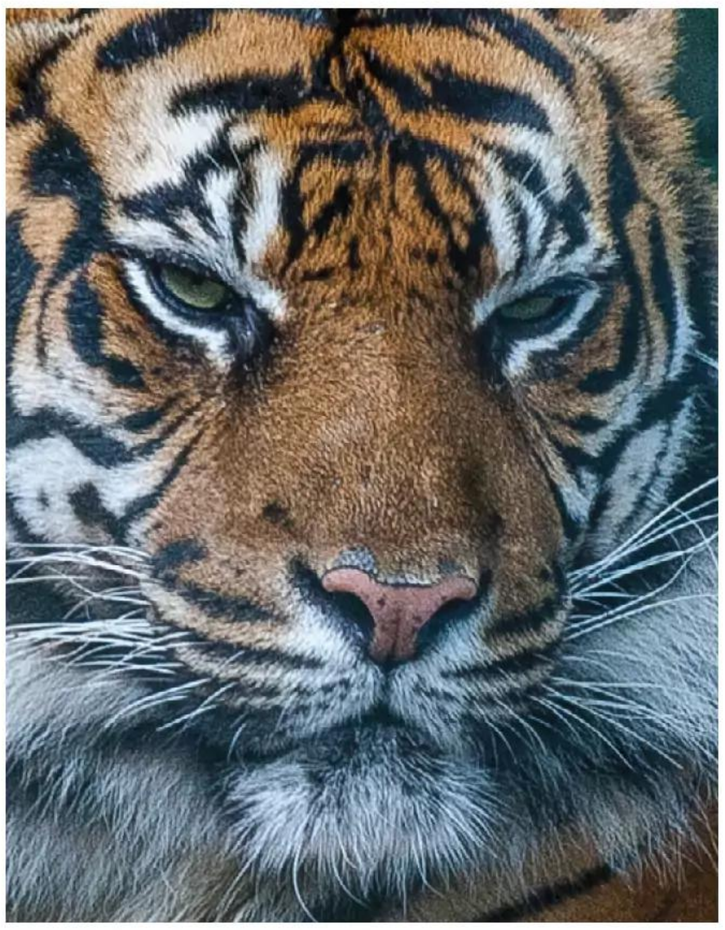
Photographing a pot bellied pig whilst standing up means you only see it from a human perspective. Photograph it from its point of view for a more intimate shot.

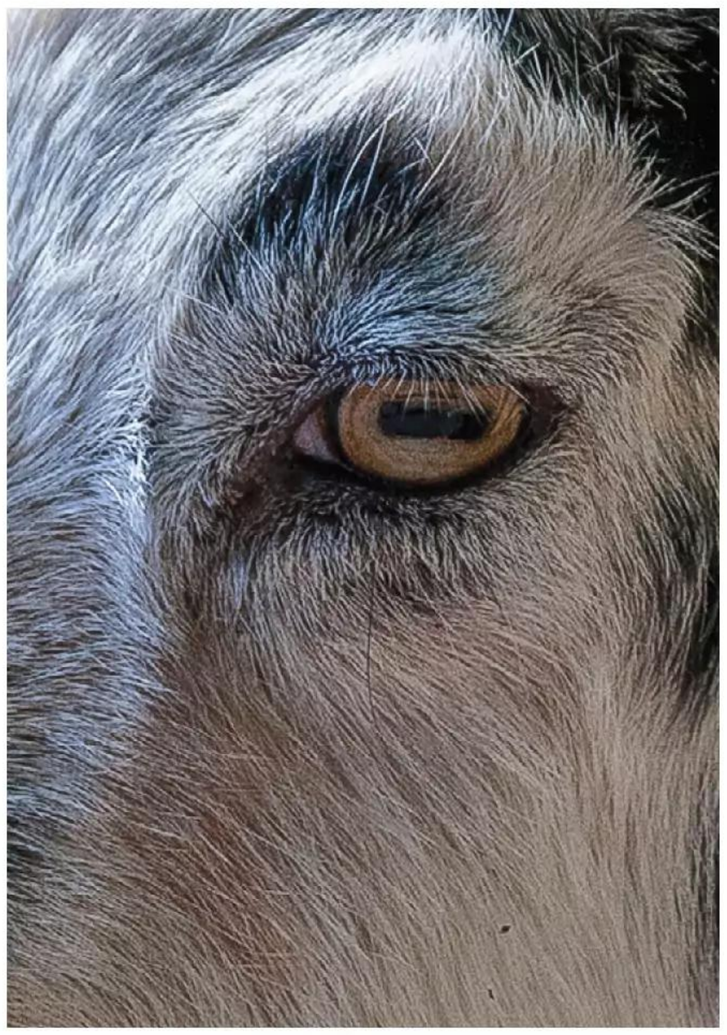
Wait for it

Animals are unpredictable to say the least. The best kind of wildlife photography shows animals displaying behaviour, rather than just sitting immobile. Be prepared to sit and wait, with your eye glued to your viewfinder, for something to happen. It might sound odd, but keep both eyes open whilst looking through the viewfinder. Your peripheral vision in the eye not looking through the viewfinder helps you to spot something that might happen in the wider context and you may 'see' the shot coming. Be on your guard for two baboons to start squabbling or for lion cubs to start play-fighting whilst the lioness looks on. You just never know.

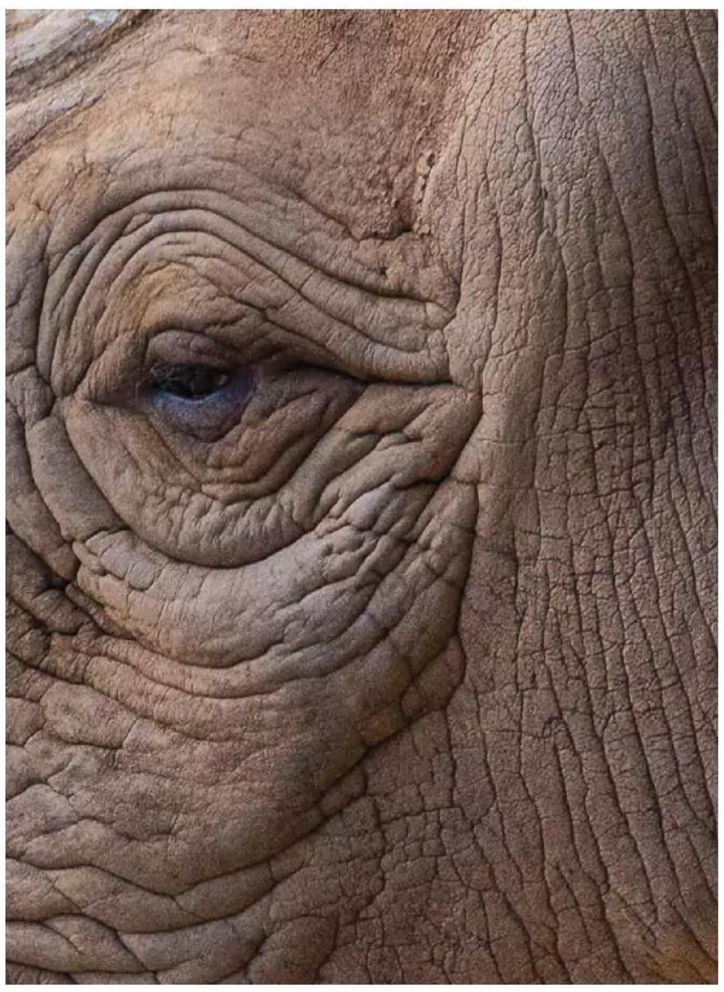
This lion was far too close to the fence to avoid the criss-cross pattern of the wire being visible. In cases like this, why not just make a feature of it? An image like this might have more impact and can be more of a statement.

A tripod can double up as a monopod at a pinch if you are in a tight spot as shown below. Although not as stable, it will help you keep your camera a little more solid as you go for those shots where shutter speeds are too slow to enable you to go hand held.





Sometimes, no matter what angle you shoot from, there may always be some man-made object that gives the zoo environment away. In cases like that, you can also crop images very tight for a more abstract feel to remove as much of those unwanted distractions as possible.



Think fast

Most of your subjects will be moving targets. Keep your shutter speeds high and you'll eliminate camera shake. Shoot in Aperture Priority and dial up your camera ISO setting and keep your aperture at its maximum f/2.8-f/4 if you have it, and try and get your shutter speed to 1/500 or beyond. It's better to have a noisy but sharp image due to high ISO, than a completely unusable blurred image of a chimpanzee leaping from tree to tree. If your camera has a continuous shooting mode, activate it. You can shoot a small sequence of shots and stand a better chance of getting the 'moment' you were after within that sequence.

Lock on

For shooting animals in motion, focusing mode is down to your style of shooting, but a good place to start is with AI Servo mode. This mode allows you to lock an AF point on your subject, and while depressing your shutter button half way down, it will continue to track the subject as long as you keep the AF point on the subject as it moves. It can take a bit of practice, and certain focus tracking systems may not be so sensitive in low light.

Above all else, abide by the rules of the zoo, always be courteous, do not attempt to put yourself or the animals in danger in any way and be mindful of using flash that might startle the animals. Take many shots, memory is cheap, you increase your chances of nabbing a cool shot if you shoot more. Finally... enjoy your day at the zoo. ■

The power of silhouettes

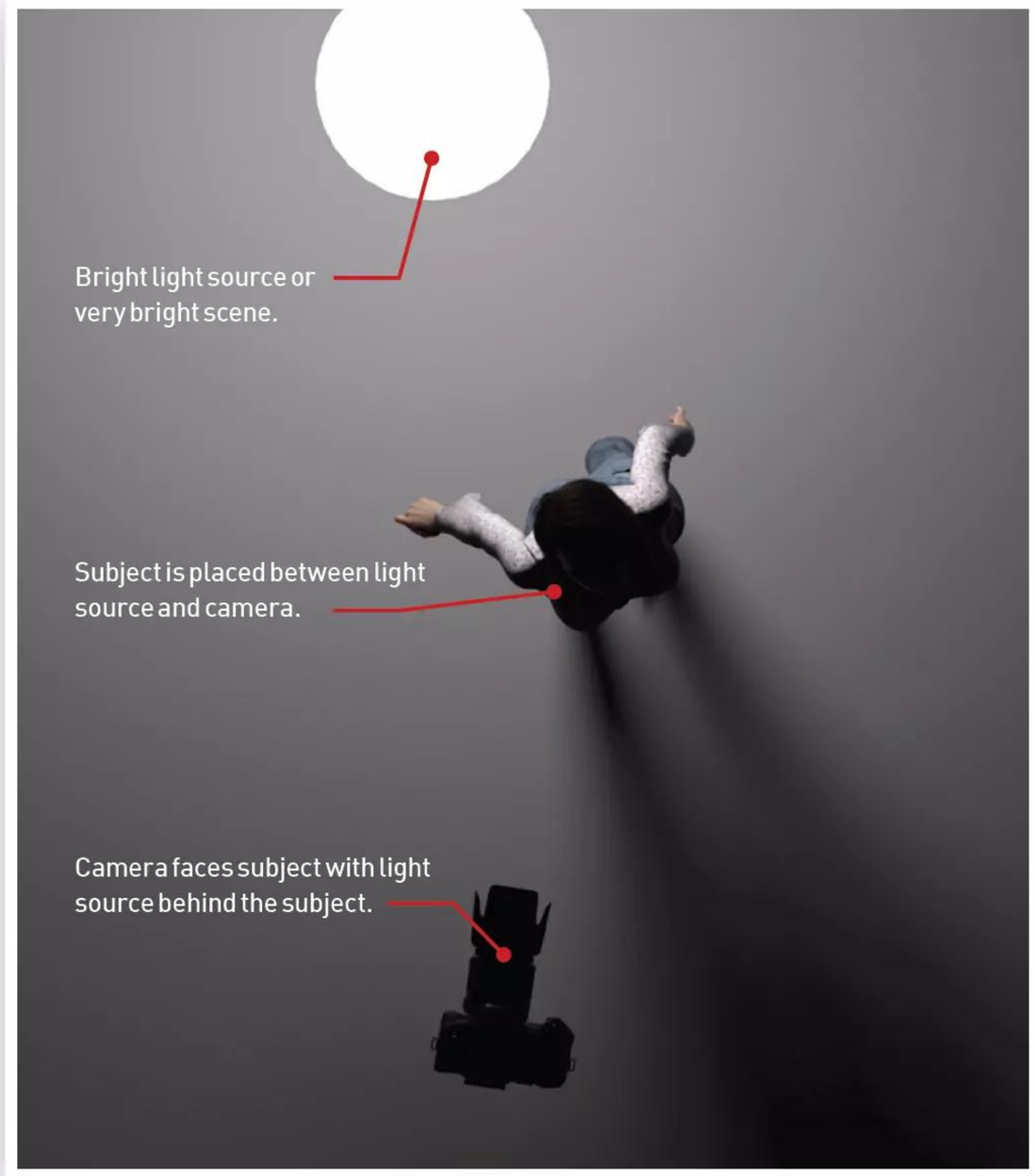
Strike the perfect balance of light and dark

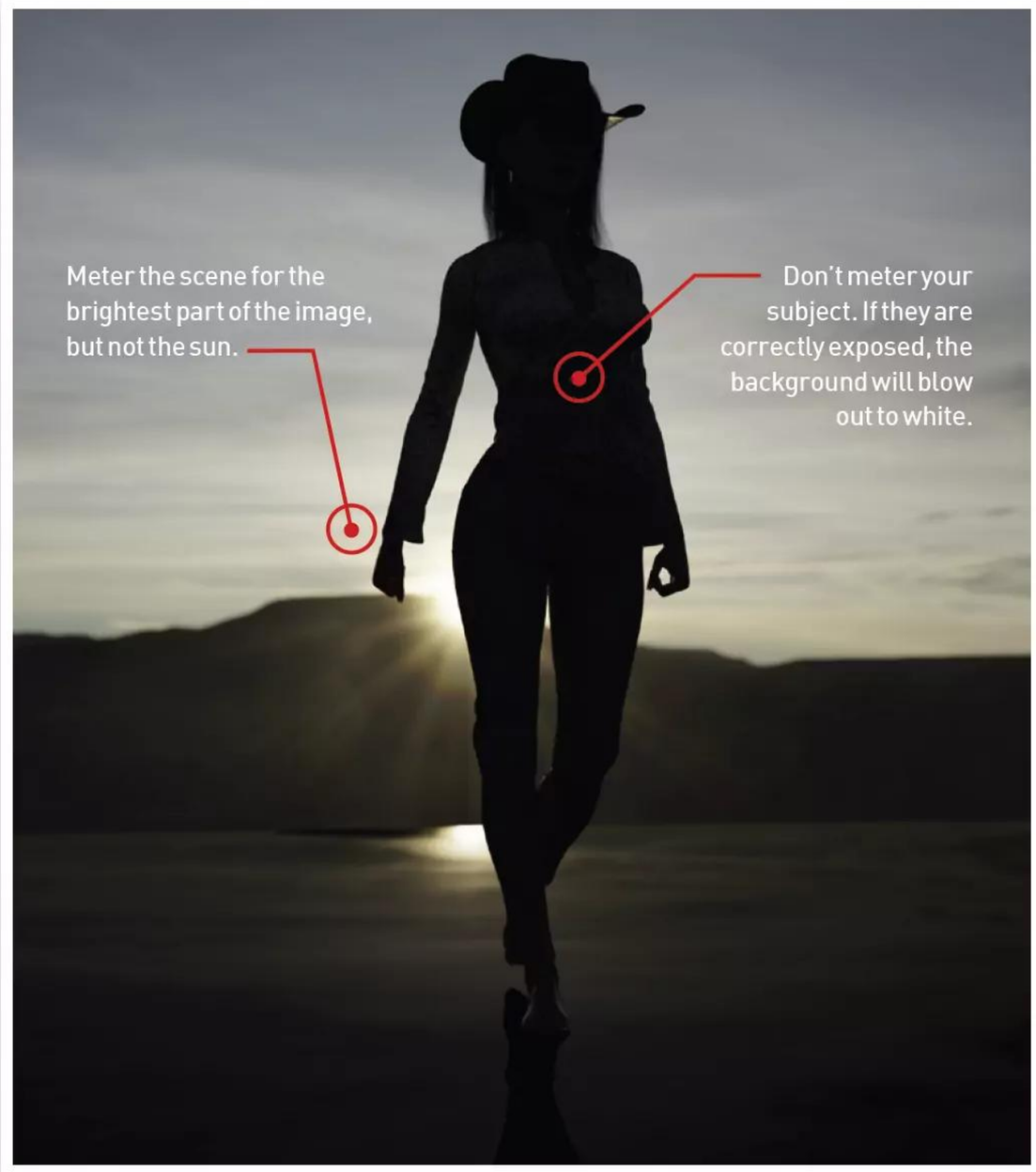
Let's get that word out of the way first. Silhouette, what does it mean? It came into being as a result of severe economic demands imposed upon the French people by their finance minister Étienne de Silhouette in 1759. His name became linked with anything that was thought to be done cheaply. In the days before photography, making a portrait cheaply and quickly from paper became known as a silhouette. It is a term used to describe the image of a person or object that is represented as a solid shape. The interior of the shape is totally black and featureless. Only the edge of the object describes what the object actually is. The term silhouette was originally thought to describe pieces of paper that were cut out and stuck to a contrasting coloured backing sheet, although the actual name 'silhouette' didn't become a well-used term until the early 19th century. Portraits cut from black card, became a very popular and quick alternative to the portrait painting or portrait miniature.

"It is a term used to describe the image of a person or object that is represented as a solid shape. The interior of the shape is totally black and featureless."

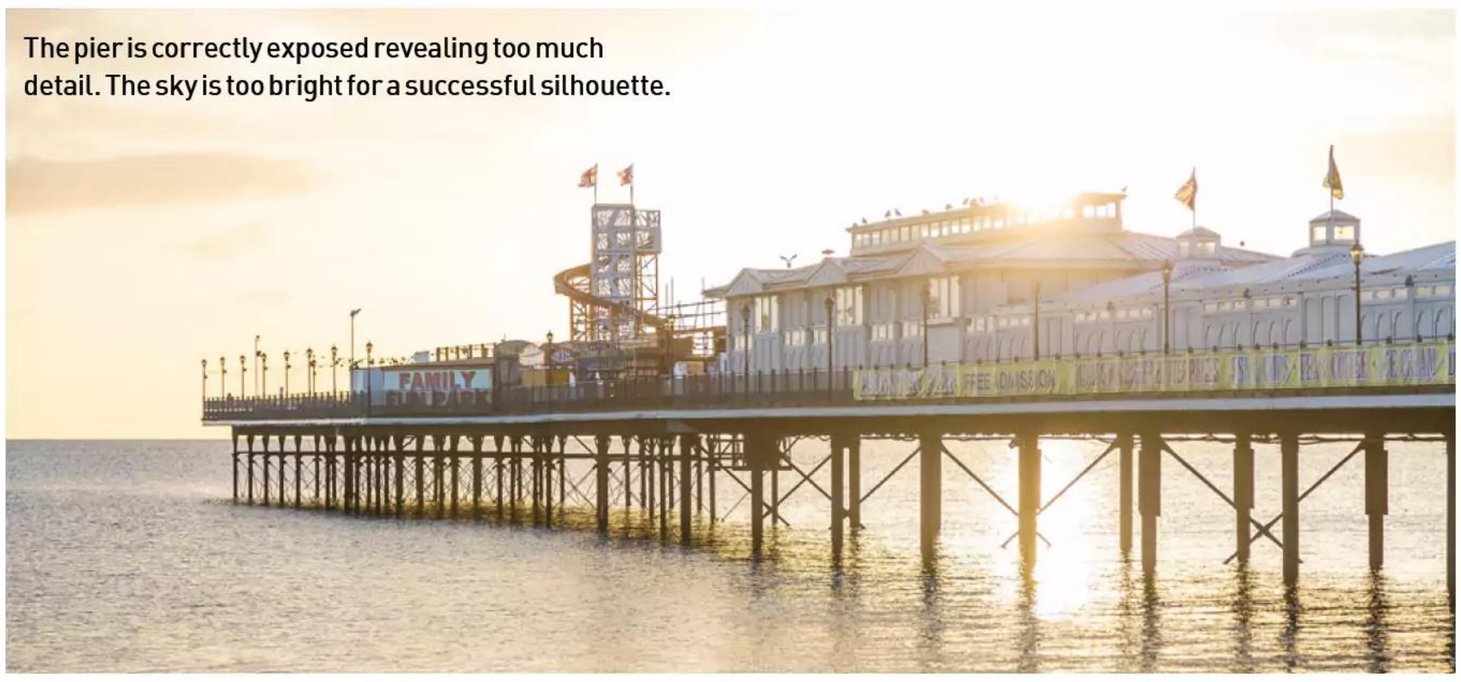
Maintaining a good exposure for the brightest parts of the image can just about guarantee the rest will fall into dark shadow with little or no detail to be seen. A little nudge in the right direction with post-work will help.

The basics of backlighting


Bright light source or very bright scene.
Subject is placed between light source and camera.
Camera faces subject with light source behind the subject.


Meter the scene for the brightest part of the image, but not the sun.
Don't meter your subject. If they are correctly exposed, the background will blow out to white.

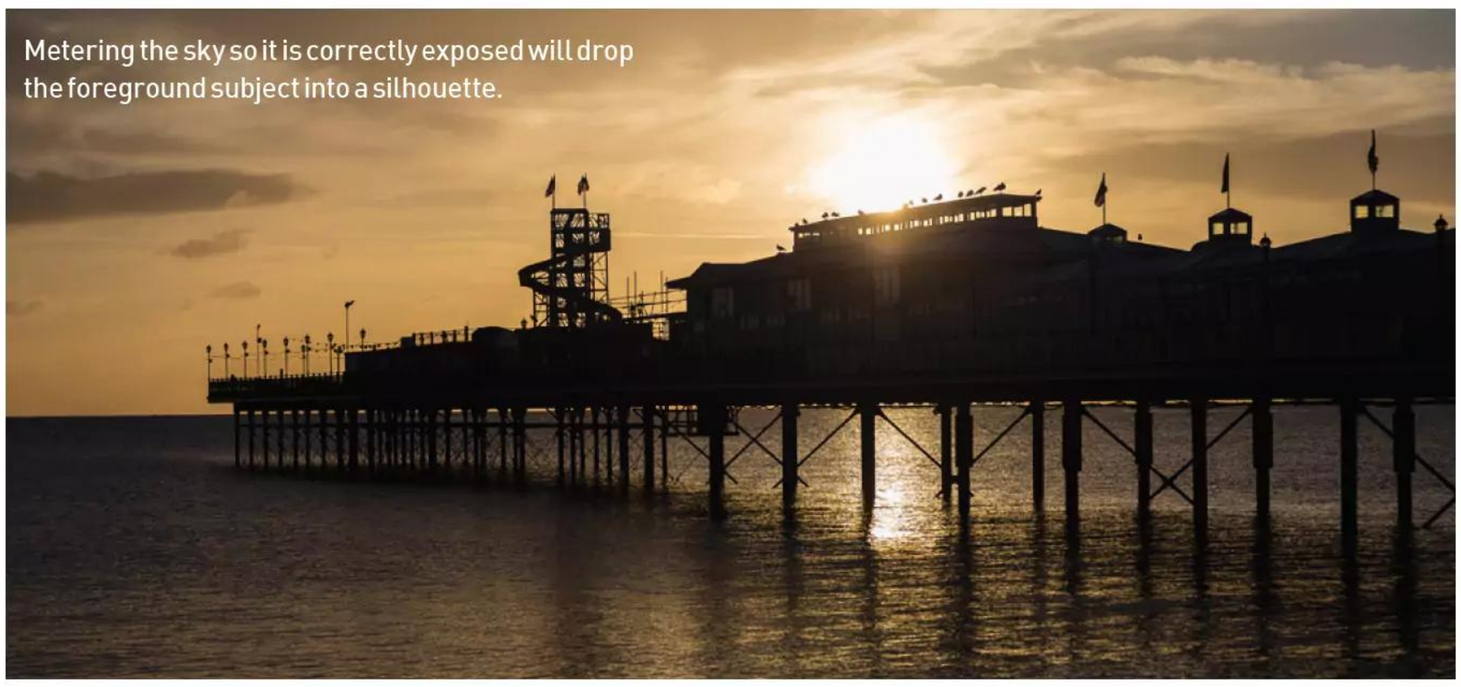
From that original meaning, it has now become a popular term to describe anything that appears as a shape dark against a much brighter background. The fields of architecture, moviemaking, fashion and photography all use the word silhouette as a descriptor for the form, shape and outline of an object, person, building and so on. In photographic terms at least, a silhouette is actually similar to a black and white shot. A black and white image relies on form, texture and composition since one of the key ingredients, colour, has been removed. Silhouettes are similar in the sense that they have had most of their detail and texture removed. The shot now relies on the composition, the form of the subject and being able to convey a mood, or story with the kind of presentation that is more akin to shadow puppet theatre.



The pier is correctly exposed revealing too much detail. The sky is too bright for a successful silhouette.

Basic ingredients

So what do you need to make a silhouette happen? First, you'll need your subject to be backlit. Backlighting is the term used to describe a lighting technique whereby a strong light source such as the sun, flashgun or even just a bright window in a dark room is positioned in such a way that it is directly facing the camera, or is at a slight angle to it. The subject is then placed between the camera and the bright source of light. Because of the strength of the backlight, the subject is reduced to a dark shape since they are in shadow. Depending on the angle of the backlight, you can create a highlight on the edges of your subject which is known as rim-lighting or kick-lighting.



Metering the sky so it is correctly exposed will drop the foreground subject into a silhouette.

Given the right conditions, even night time shots can create some cool silhouettes. With a long enough exposure, a night sky with stars and clouds can still be brighter than an unlit foreground object.

Embrace the dark

Shooting this technique requires you to throw away the rulebook in a sense, to achieve the very specific look that defines a silhouette. For a conventional backlit portrait, you would use some additional lighting from a flash or a reflector to make sure your subject didn't fall into completely dark shadow and make sure detail is preserved. Now though, you are going to reduce the subject to solid black or at least as close as we can get to it without ruining the rest of the shot. The basic premise here, is that you are deliberately going to underexpose the shots by a specific amount to correctly expose the very brightest parts of the scene, which should then render the subject totally dark.

Partial silhouettes are also very effective. In this case, rather that the light source being directly behind the subject, it is slightly off to one side. This gives you what is known as a rim light.

Shooting silhouettes

Although the capture of silhouettes is fairly straightforward, there are a few things to be aware of to make sure you actually get what you are hoping for. Modern cameras will always do their best to meter the scene for the best overall exposure and if you use a camera in fully automatic mode, then you lose any input in the decision making process when you take the shot. For the best control of the situation, you should consider shooting in fully manual mode. Now the decision making is yours alone and you can fine tune your shots to make sure they turn out as proper silhouettes. ■

Night photography

Some tips for quality night shots

A good quality, stable tripod, is essential for long exposure photography.

Whether it's the lure of bright city lights, barren moorland bathed in moonlight or a tumbledown barn in the country under a starry sky, night-time photography is a big draw for many photographers. It can be challenging, it can be very frustrating and time-consuming, but once you get the bug for it and get those first few 'wow!' images under your belt, it's a hard habit to break. There are a lot of photographers who find the whole process very relaxing.

As you are normally dealing with much longer exposures than usual and having to carefully compose and focus your shots, it forces you to slow it all down and take a much more considered approach. After all, if you set up a ten-minute exposure and the end result is disappointing, you could angrily pack up your gear, set off home, and miss out on a very rewarding aspect of photography. To make sure you get the most out of your photos, here are a few tips that should see you well on your way to capturing amazing night shots.

Use a tripod

This may sound a bit obvious, but if you want to take photographs where exposure times can sometimes be in the tens of minutes, you're going to need something sturdy to put your camera on. You can of course set your camera to its highest ISO setting, open the aperture as wide as it will

go and shoot handheld, but to really do the image justice you're going to need a solid tripod. One thing is worth mentioning; pay particular attention to the surface on which you're setting your tripod. shooting at the water's edge on a beach is a good example. The tripod may be pushed firmly into the sand and your long exposure is under way. One larger-than-usual wave and the feet of your tripod are swamped. Not a big deal, but the water can soak into the sand, which becomes soft, and the tripod can start to list over to one side ruining the shot. An attempt higher up the shoreline away from the waves might be in order.

Keep the ISO low

Because you have your tripod keeping things steady for the camera, you can use the lowest ISO setting your camera will allow. This is a big advantage from the point of view of image quality. High ISO settings create a lot of image noise, and can affect the sharpness of the shot, detracting from the overall quality of the image. Many modern cameras can produce fairly clean shots at high ISO, and it may well be that you can work in the 800-1000 ISO range if the situation demands it, but generally the lower the ISO setting, the better the result will be.

A lot of cameras also offer Long Exposure Noise Reduction (LENR). This works by taking a second exposure of just the sensor noise which is then used to subtract the noise from your original shot. What this means is that if you take a five-minute exposure, it will then take another five-minute LENR exposure. For any exposure longer than a couple of minutes, the sensor may start to heat up and this introduces noise artefacts. This is what LENR is trying to remove. It's just a personal preference but many don't use LENR. Like a lot of recent DSLRs most cameras use a CMOS sensor which isn't as prone to overheating, and you could take ten-minute exposures without any noise issues. If you want to try very long night-time images like star trails, consider taking multiple exposures of 30 seconds each and stacking them in Photoshop. For example, 30 exposures of 30 seconds each is equivalent to one 15 minute exposure.

Shoot raw

Shooting in raw mode is a method that allows you to extract the absolute last pixel of quality from your image and process it any number of creative ways non-destructively. You can happily alter white balance settings, cross-process, split raw and any number of effects without losing your original image. Like using low ISO, it's another way of keeping the image quality as high as possible.

Lenses: zoom or prime?

When you're shooting at night there are any number of light sources, such as street lights, headlights, the moon, bright windows, neon signs, all of which are capable of introducing unwanted lens-flare that can ruin an otherwise excellent shot. Lens flare is caused by unwanted light scattered by the optical elements inside your lens. Zoom lenses particularly suffer from flare as they contain many more optical elements. Your best chance of reducing lens flare is to use a prime lens. A prime is a lens that only has one set focal distance and therefore uses fewer internal optical elements. Whether you use a zoom or a prime, a lens hood is recommended for both. Also, wherever possible, use a lens with as wide a maximum aperture as possible, such as f/2.8. You may well be shooting at smaller apertures than this but the image in the viewfinder will be brighter with a faster lens, helping you to see and set up your composition.

Bulb mode

With most current DSLRs the longest shutter speed you can use in normal operation is 30 seconds. However if you switch to Bulb mode ("B") on your camera, you can keep the shutter open for much longer periods. "Bulb" in this case is a reference to the old squeeze-bulb, pneumatically activated shutter release systems from the earliest days of photography. What you don't want to be doing though is standing there with your finger on the shutter release button for five minutes. Your finger is going to ache and you are going to move the camera and spoil the shot. Attaching a cable release instead is the answer.

A good quality lens, whether prime or zoom, is expensive, but it is expensive for a reason.

The cable release makes the process of shooting long exposures much easier.

This means you can activate the shutter and lock it open for as long as you need. These vary from the simplest 'press to activate' types to fully programmable interval timers that can take multiple shots with durations and intervals between shots set by the user.

Take test shots at high ISO

Since most modern cameras offer very high ISO settings, it makes sense, before committing to a long exposure or a sequence of long exposures, to ramp up the ISO to the max, take a shot and have a look at the composition, framing and exposure. However if you've just done your test shot at 2000 ISO and it looks great, how does that translate to shooting the same scene but at a lower ISO setting to get the quality?

There is some maths involved but it's not

Ex
Expositor
Exposure Compensation:
+0
-1
-1/3
+1/3
+1
Reset
Exposure Compensation Adjusts:
ISO
F-Stop
Exposure Level Increments:
1/2 Stops
1/3 Stops
Scene & Exposure Value (EV)
ISO / Sensitivity
F-Stop / Aperture
Shutter Speed
Subjects under dim ambient artificial light
Subjects under very dim ambient artificial light
Snow or sand under a full moon
Subjects under a full moon
Subjects under a half moon, Meteor showers (timed exposures), Bright Aurora Borealis or Australis
Subjects under a crescent moon, away from city lights, Medium Aurora Borealis or Australis
Subjects under starlight, away from city lights
Any of the EV & ISO pairs above should expose well when combined with any of...
...these F-Stop & Shutter Speed pairs

Expositor is a great app for helping you calculate those tricky exposure times.

complicated, especially if you have your mobile phone with you.

The mathematical bit

At 2000 ISO your camera meter tells you that for the aperture you have set, a shutter speed of five seconds gives you a good exposure. Now you need to know how that exposure will change when you dial your ISO down to 100. Divide your high ISO number by the target low ISO number (2000/100 = 20), take your answer (20) and multiply it by the high ISO exposure value five seconds - this gets you a final answer of 100 seconds (1.6 minutes). Still with us? If you prefer, there are apps for iOS and Android that can do the heavy lifting for you. A popular one called Expositor, has a nice user-interface that can quickly calculate any combination of EV, ISO, F-stop and exposure time you care to dial in. It's great for quickly and accurately working out the arithmetic without the need to do the sums in your head.

Earth, sky and water

Use this to your advantage. It may have been done to death, but a coastline shot taken with a long exposure reduces the sea to that wonderful misty blanket. If there are patches of clouds in the shot, they appear to streak across the sky when your exposures get up beyond 30 seconds or more. Of course, who can forget traffic trails? They are the staple of long exposure photography. The key word here is experimentation.

Light painting

Seen in the photograph at the top of this page, this refers to the technique of illuminating parts of your scene with additional light sources other than those in the shot. Light painting has become very popular and ranges from simply using a flashlight to illuminate a dark foreground subject, to using all manner of light sources, such as strobes, sparklers, coloured LED lights and even steel wool set alight to create huge showers of sparks, all of which create bizarre and abstract "light art". It's worth looking into if you're thinking of taking night photography to a whole new place.

It's dark out there. Go take some photographs. What are you waiting for? ■

Action and sports

How to capture movement and excitement

Photographing sports and action scenes is a challenging but rewarding part of the hobby. At almost any sporting event, from the company five-a-side team on a Saturday fixture, to international events like the Olympics or the World Cup, you'll find photographers on the sidelines capturing the action. Professional sports photographers make a good living from it, and use specialised equipment such as advanced high-speed cameras and ultra-fast telephoto lenses costing thousands of pounds, but even the average hobby photographer with basic equipment can capture good sports and action shots with a bit of patience and effort.

There are no hard-and-fast rules for sports photography, mainly because there are so many different types of sporting event. A technique that might work well for horse racing would be completely inappropriate for beach volleyball, for example. You have to learn to tailor your technique and the way you use your gear to the event you're trying to photograph. Many professional sports photographers will specialise in one particular type of event, becoming experts in one or two techniques that work well and can guarantee them the reliably good results they need.

Although there are as many techniques for sports photography as there are types of sport, there are some general tips that work well in most situations.

> "Many professional sports shooters will specialise in one particular type of event, becoming experts in one or two techniques that work well."

For up-close water-based action, a waterproof camera or camera housing is essential, but will yield results that cannot be captured any other way. The Nikon WP-N1, for example, is built for the Nikon 1 J series and provides ample protection for underwater shooting.

Get close to the action

There's a reason why ringside or front-row seats are more expensive. If you want to see the excitement and passion of a close-fought contest, it's a lot harder to do that from 200 yards away over the heads of a crowd. Get as close as you can without putting yourself in danger or interfering with the event you're trying to photograph. For events where you can't get physically close, use a telephoto lens to zoom in.

Capture the moment

Although most people seem to think that a fast continuous shooting speed is the key to action photography, in fact the professionals will tell you that good timing and fast reactions are much more important. It also helps enormously if you have an understanding of the sport you're photographing so that you can anticipate when the best moments are going to come along. A camera with a good fast autofocus system and quick shutter response is much better for action photography than one that can shoot at 10 frames a second. Being in the right place is also important. You're going to get more drama at the finish line of a race than halfway down the track.

Control shutter speed

One of the keys to good action photography is appropriate use of shutter speed. Although

Sportsmen and women don't like to be distracted when competing. Using a long telephoto lens like this AF-S Nikkor 600mm f/4E will keep you a safe distance from your subject, who may be at a critical point in their sport.

For shooters with Nikon APS-C sensor cameras that use the DX range of lenses, you could consider the AF-S DX Nikkor 55-300mm f4.5-5.6G ED VR image stabilised telephoto zoom lens. It is compact and lightweight and its focal length range is equivalent to 110-450mm in 35mm terms.

the traditional approach to sports and action photography is to use the fastest shutter speed available, and the sports mode on your camera will try to do this automatically, it's not always the best approach. Using a very fast shutter speed freezes the action, which can rob the picture of any sense of movement. To capture fast-moving subjects, try using a slightly slower shutter speed and panning to follow the action. If you do it right you'll have your subject nice and sharp against a movement-blurred background. If you are using a normal telephoto or zoom lens, i.e. not one that cost £3,000, then the restricted aperture at longer focal lengths will limit your choice of shutter speeds; don't forget you can get faster speeds at higher ISO settings, although beware of image noise above about 1600 ISO.

Compose your shot

Just because you're documenting a sporting event, it doesn't mean your shots can't be well-composed. Try to find a viewpoint that provides an interesting angle, or at least an appealing backdrop to your shot. If you can compose your shot so that it both looks good and provides an accurate impression of the event, so much the better.

One of the most useful compositional tips for action photography is the concept of implied movement; always try to have your subject moving into the frame rather than out of it. ■

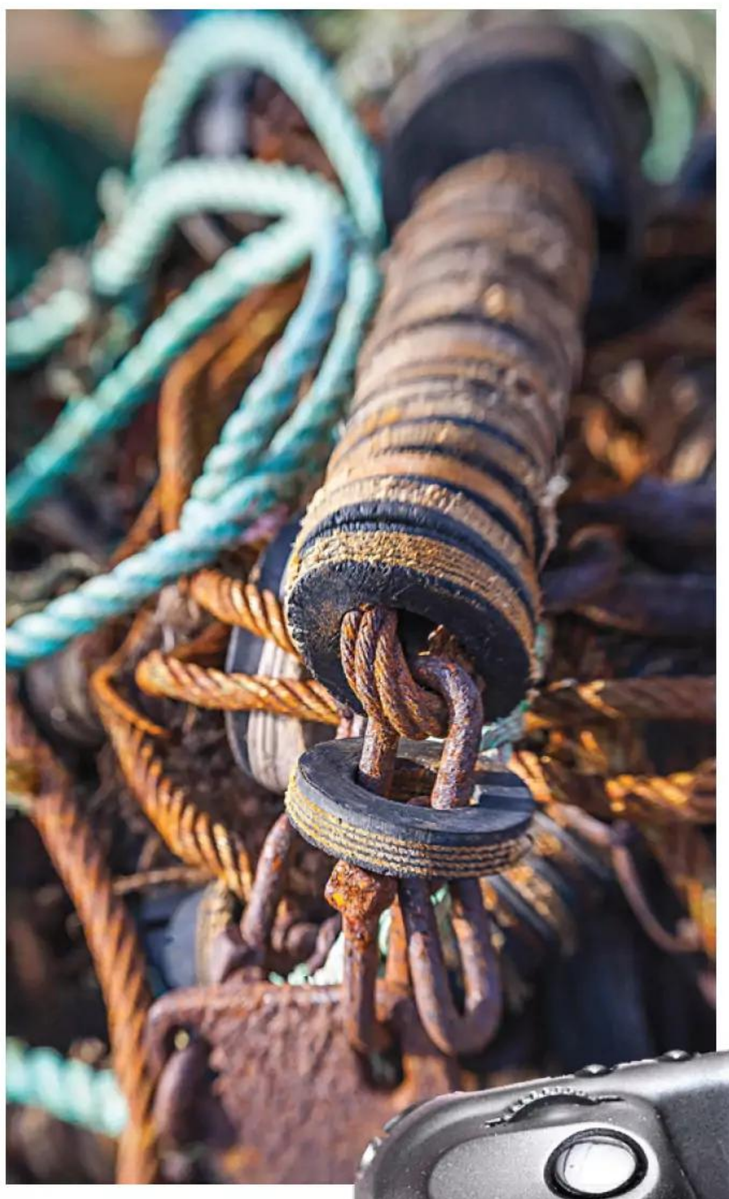
Selective focus

Where blur is beautiful

Selective focus is the term used to describe the method by which you render one part of your shot in sharp focus and the area beyond and/or in front increasingly out of focus. Any shot that has a small area of sharp focus whilst everything else is blurred, draws the eye to that focused area. Typically it is achieved using lenses with very large apertures of f/2.8 to f/1.2 or even wider. NASA once developed a lens that had a maximum aperture of f/0.7 that was used by the famous filmmaker Stanley Kubrick for one of his early films.

This butterfly on a dandelion was taken with a 100mm f/2.8 macro lens. Although the butterfly was not caught at the lens's closest focusing distance, it still manages to fill a lot of the frame. The very shallow depth of field blurs the background and removes any distractions.

Below are some Lensbaby image examples. The Lensbaby optics are set at f/5.6 with a 50mm field of view. You will need to adjust your shutter speed and ISO accordingly to correctly expose your images. It is up to you to manually operate the 'bellows' to pick your point of focus and move it around the frame.



As is the way in photography, any lens that incorporates 'fast glass' usually comes at a price. Prices can range from £75 for a basic 50mm f/1.8 prime lens up to £1700 for an 85mm f/1.2 prime and a poverty-inducing £8000 for a 400mm f/2.8 super-telephoto lens. Another specialist lens that allows you to tinker with focus in interesting ways is the tilt-shift lens. It is made up of a special mechanism that can let the lens tilt up and down by about 7° and also shift left and right (or up and down if the lens is rotated) by about 12mm in each direction. A typical tilt-shift lens will set you back £1800. The so-called tilt-shift effect creates images that look like miniatures and has become very popular.

There are a series of lenses made by the company Lensbaby who manufacture effects lenses. One such lens is the Lensbaby Spark that behaves a little bit like a tilt-shift lens. It is cheap, made of plastic and is operated manually by hand. The front element is mounted on a plastic bellows that you have to squeeze in and out to focus and then bend up and down, left and right, to move that focus point around the frame. At £50 it is perhaps sitting at the far opposite end of the scale from a proper tilt-shift lens and it does take some getting used to. It's cheapness does make it accessible and it can be good fun once you've mastered the slightly odd focus system.

In terms of the image quality, if you set your expectations low enough, it will yield some decent results. The effect it produces I would describe as 'lo-fi meets tilt-shift'. You could argue that the effect could be produced in Photoshop, and you would be right, but it is a very hands-on way of experiencing how selective focus works. ■

The Canon TS-E 17mm. A great tilt-shift lens with an even greater price tag to match.

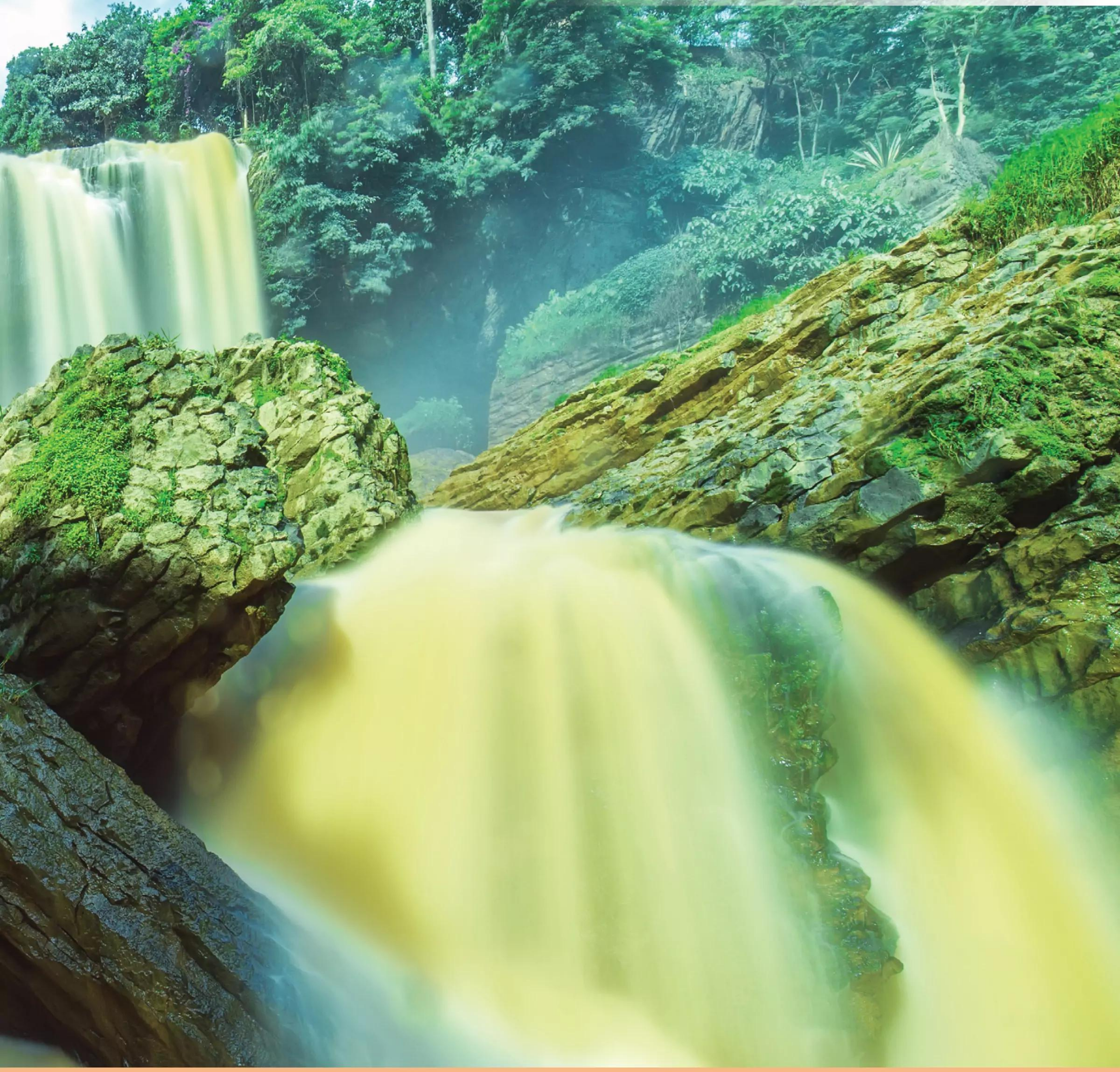
Although not a true tilt-shift lens and with image quality that can't match up to a good prime lens, the Lensbaby Spark is a fun effects lens that gives a great hands-on experience when exploring the world of shallow depth of field and selective focus photography.

Daytime long exposure photography

Give your daytime shots a long exposure twist

> **"Those longer exposure times mean that moving objects, be they clouds, the sea, cars or people take on a more other-worldly feel."**

It may sound counterintuitive. Why would you want long exposures during the day? Daytime shooting means you have no shortage of light, shutter speeds are high and there is little chance of either motion blur or camera shake. Why would you deliberately want to choose slow shutter speeds? It is, for want of a better phrase, an artistic choice. We are very used to seeing images taken in the daytime that are sharp, free from camera shake or motion blur where everything is static and frozen in place.



That's fine if it's what you are after but consider how the world changes when you shoot at night (apart from it being dark of course). Things are a little more surreal at night when shutter speeds drop to seconds or even minutes. Those longer exposure times mean that moving objects, be they clouds, the sea, cars or people take on a more other-worldly feel. Translating some of that feel to a daytime shot can be great fun and elevates the shot from a standard capture into a creative work that can be very engaging to the viewer. So how do you take control daylight itself to achieve the shutter speeds required? You will need a couple of pieces of the right equipment. It goes without saying that first up is your camera and your favourite lens. For this kind of work a good setup would be a Nikon D800 or Canon 5DMK3 and either a 24-70mm f/2.8 zoom or possibly a 14-24mm f/2.8 wide angle lens.

Because you are dealing with deliberately long exposures there is no question you are going to need a tripod. The shutter speeds you may encounter will require that you use a remote shutter release. Last, and certainly not least, is a neutral density filter. Without this bit of kit, the long exposures you require just can't happen.

A neutral density filter is almost like sunglasses for your camera lens. It filters out a certain amount of light so you 'see' the world darker than it really is. It is reducing the amount of light that is actually passing through the lens to your camera's sensor. It has also been likened to the glass in a welder's mask. In fact, in some cases, enterprising photographers have actually used welder's mask glass as an ND filter.

A 24-70mm lens above is a great all round piece of glass for most shooting conditions. If you find you need a greater field of view, then something in the 14-24mm range below is what you'll need.

Manufacturers like Lee and Cokin produce a range of rectangular filters and filter holders.

Screw in filters can be cheaper but you are restricted by having to buy ones that will fit the diameter of each lens you are using.

A sturdy tripod is essential for long exposure photography to avoid any possible camera shake.

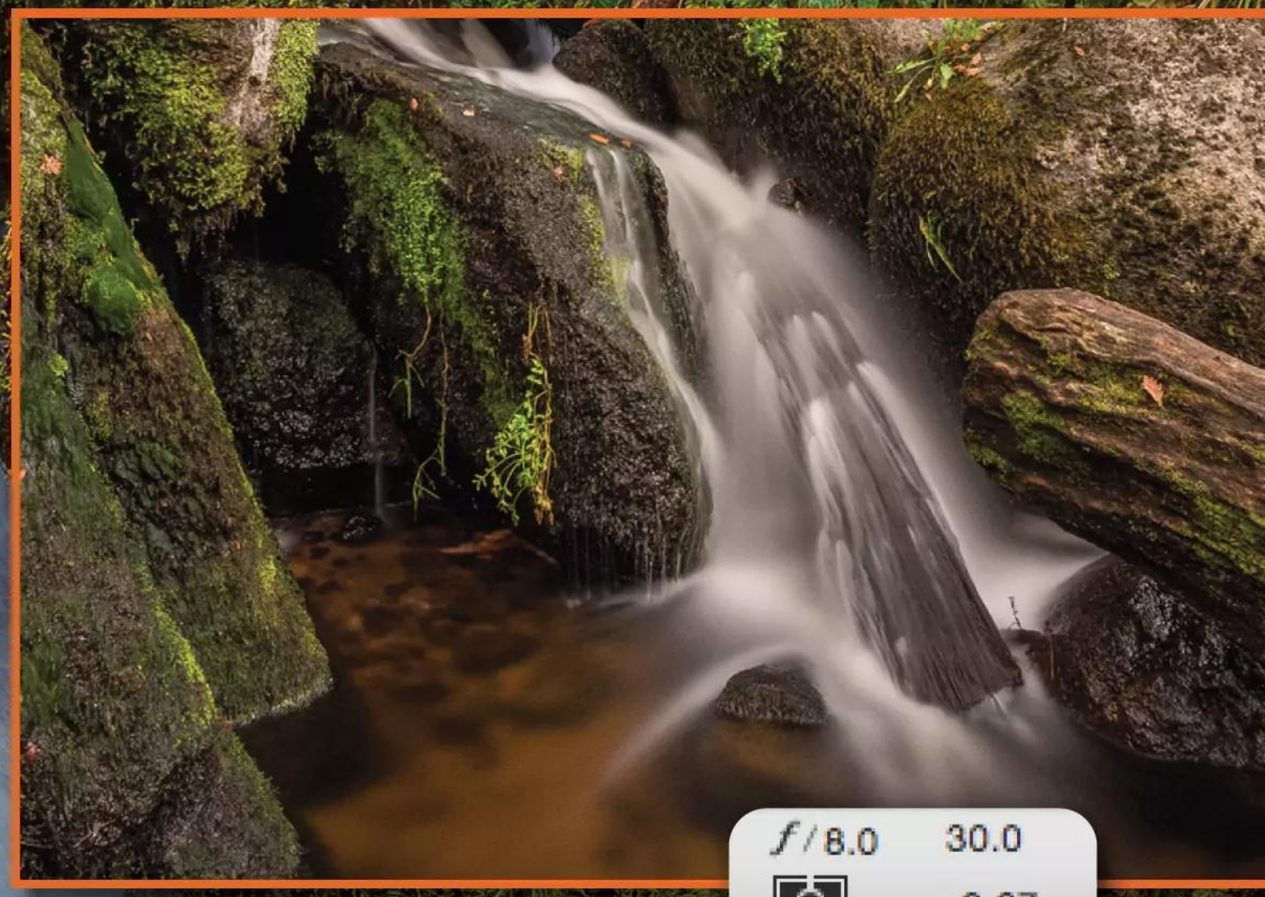
A good cable release or one of the more exotic intervalometers is also a useful item to control your camera remotely when shooting longer exposures.

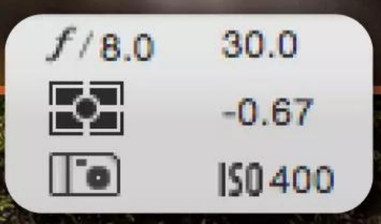
There are many types of ND filters. There are the versions that are flat rectangular pieces of plastic that slide into place in a holder that screws to the front of your lens via an adaptor ring. There are also the circular screw-on types of various sizes for different lenses, which you can fit directly to the front of your lens as if it were a standard UV filter.

Crucially, they also come in a range of optical densities. A filter rated as an ND2 will only let 50 per cent of available light through (equivalent to a 1-stop reduction), whereas an ND4 will only let in 25 per cent (2-stops reduction), an ND8 lets in 12.5 per cent (3-stops reduction), ND16 blocks 6.25 per cent (4-stops reduction) and so on. For long exposures in daylight, you need to be working around the ND1024 area, which is a 10-stop reduction allowing only 0.098 per cent of available light to enter the camera and hit the sensor.

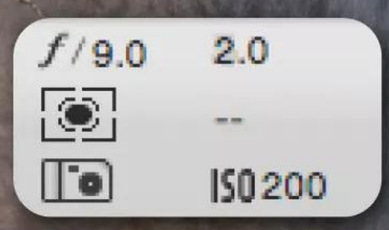
As you would imagine, prices for these filters vary too. A ten-stop filter by Lee, for example, is in the range of £90 but you will also need to purchase the filter holder kit that it needs as well for about £65. The single screw-in type filter, depending on the lens size that it has to fit, can be anything up to £100. These filters can be a bit pricey but they are worth their weight in gold.

So, you screw on your filter and point your camera at the scene you want to capture and off you go. Well, not exactly. For starters, if you look through your viewfinder, you're not going to see much. The ten-stop filter has taken care of that. You will pretty much be staring at a black image. Metering a scene with such a dense filter as this can cause problems too. Your camera is probably going to struggle to find a usable meter reading. If you stop your lens aperture down to f/11 or even f/22, you will have an exposure that is the in Bulb long exposure range anyway. The best method is to take off the filter for a moment.





Using very long exposures when shooting water can result in the popular effect of turning the water to an amorphous fog. That's all well and good but sometimes using slightly shorter exposures around the 2-8 second area can keep detail in the water, but still convey movement.



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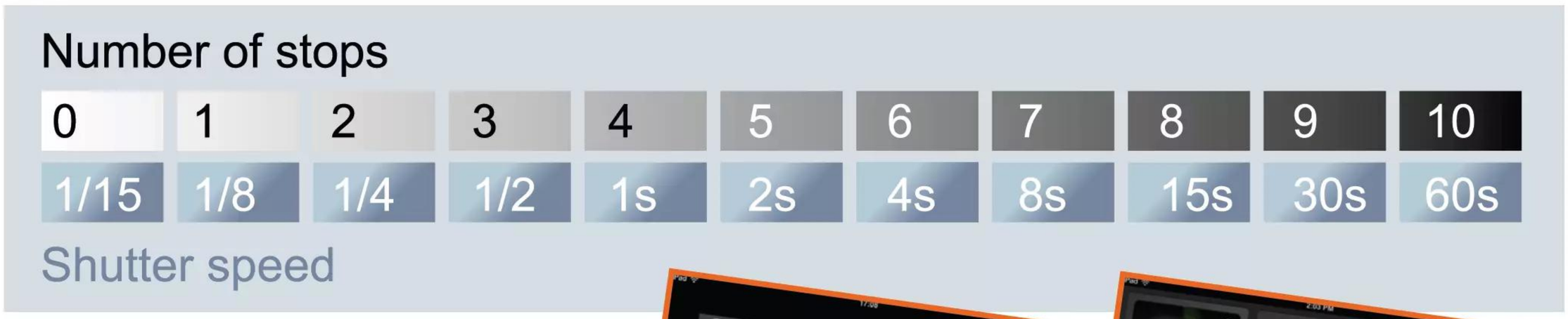
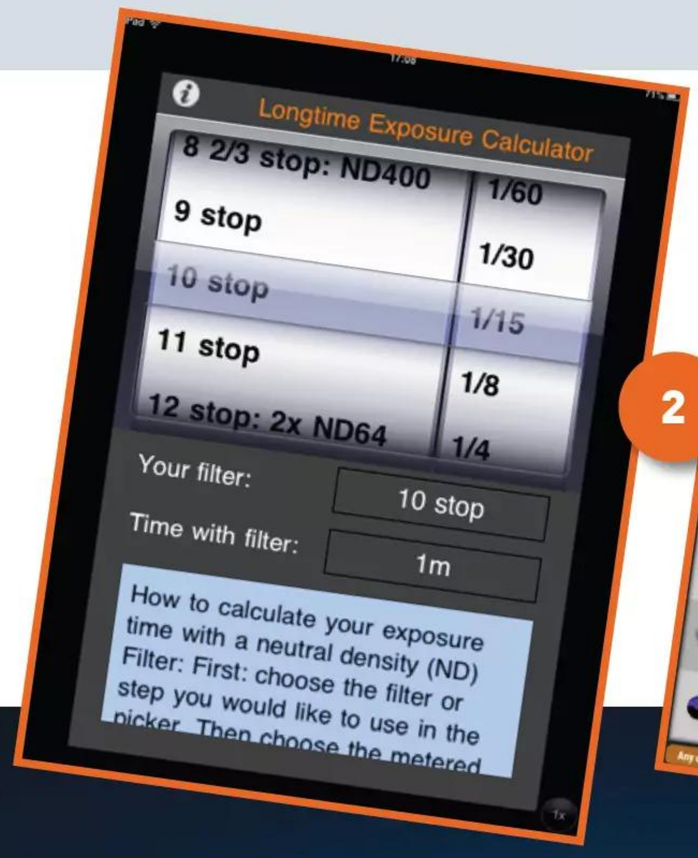


Start by composing the scene how you want it, with the ISO and aperture settings dialled in as required for the final shot, and just see what shutter speed you get. Take some test shots to make sure you're happy with the composition. At this point you need to make a note of the shutter speed you're getting without the ten-stop filter on your lens.

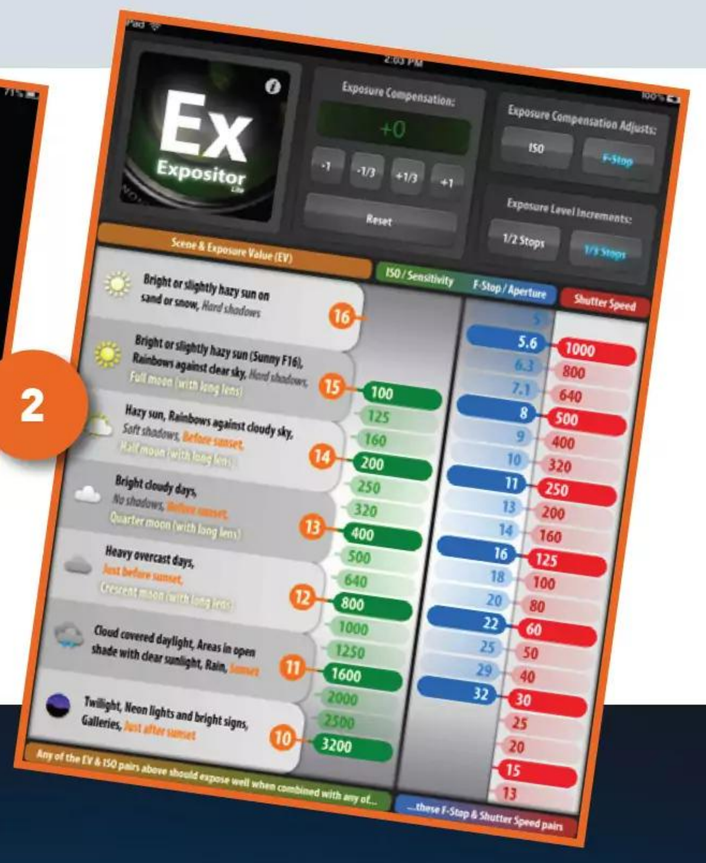
OK, there is some maths involved but it's not too scary. Before you added the ten-stop filter, your camera was telling you that for a setting of ISO 50 with an aperture of f/22 your normal meter reading required a shutter speed of 1/15th of a second. You now have to slow your shutter speed down by ten stops. In this case if you double the shutter duration ten times you will arrive at the final shutter speed that you need to use with the filter in place. Note, we are using shutter speed values which get rounded up and down in places for easier numeric values to remember **[1]**.

So, for our example, a scene that originally metered for a shutter speed of 1/15th of a second has to be altered to 60 seconds (64 seconds in non-photographer maths!). The shot should now be correctly exposed allowing for the filter being used.

If you're not so hot on the mental arithmetic, there are apps for your iOS or Android phone, that can calculate the correct exposure settings for you; for example LongTime Exposure or Expositor **[2]**.



2


Ex
Expositor
Exposure Compensation:
+0
Reset
Exposure Compensation Adjusts:
Exposure Level Increments:
Scene & Exposure Value (EV)
ISO / Sensitivity
F-Stop / Aperture
Shutter Speed
Bright or slightly hazy sun on sand or snow, Hard shadows
Bright or slightly hazy sun (Sunny F16), Rainbows against clear sky, Hard shadows, Full moon (with long lens)
Hazy sun, Rainbows against cloudy sky, Soft shadows, Before sunset, Full moon (with long lens)
Bright cloudy days, No shadows, Before sunset, Quarter moon (with long lens)
Heavy overcast days, Just before sunset, Crescent moon (with long lens)
Cloud covered daylight, Areas in open shade with clear sunlight, Rain, Sunset
Twilight, Neon lights and bright signs, Galleries, Just after sunset
Any of the EV & ISO pairs above should expose well when combined with any of...
...these F-Stop & Shutter Speed pairs

ORBITER
You Must Be This Tall
TO RIDE THE ORBITOR
Pay In The Car
SAFETY NOTICE
KEEP ARMS AND LEGS INSIDE THE CAR
NO SMOKING
DO NOT GET ON OR OFF WHILE THE RIDE IS MOVING
SECURE YOUR VALUABLES!

> "Even the most optically perfect and neutral filter can suffer from some form of colour shift when using six-stop filters or higher."

One thing to be aware of when using such dense filters is the issue of colour cast. Even the most optically perfect and neutral filter can suffer from some form of colour shift when using six-stop filters or higher. The most common issue is a magenta cast caused by Infrared light still getting through, even though the visible light spectrum has been reduced. For the best result, always shoot in Raw mode at your camera's lowest possible ISO setting.

As ever, experimentation is the key. Just keep your eyes open for some familiar daytime moving object that could look pretty surreal if captured with a long shutter speed. The technique has even been employed to magically empty city streets of people and cars by using very strong ND filters. It's up to you and your imagination now that you know daylight can be modified to give you more creative control. ■

Off-camera flash

Set your flash and your creative vision free

If you have a flash in your camera setup, you have no doubt been enjoying the benefits of having an available light source when conditions demand it. You may discover there are times when you want a little more creative control over the end result. At the moment, your flash sits atop your camera providing one light source, perhaps with the option of bouncing it off a nearby wall or ceiling if you happen to be indoors so you can modify the light to soften the shadows. Anything is better than the direct flash rabbit-in-the-headlights look right? This is great, bounce flash can create some lovely images. If you were outdoors though, trying to do a portrait, where would you bounce the flash? Options become limited, and you may have to resort to direct flash which can kill the mood of the shot. You want to be able to control the direction of light and create some highlights and shadows to add modelling and depth to the scene. This is the point where you would want to get your flash off your camera. But how do you do that?

> "Although there are a bewildering variety of options out there, the truth of the matter is, you do have plenty of choice."

Detaching the flash from your camera and still being able to control it from a distance is not as daunting a prospect as it might seem to the fledgling strobist. The basic methods you can use are:

Sync cords

A wired system of cables and adapters. Basically, this is an extension cable that connects one end to the hot-shoe of your camera and the other to your flash. You can use multiple flashes if needs be, but it will require additional cabling, adapters and splitters. Also, with the correct cable, all the flash's original functions and things like eTTL metering and High Speed Sync will be preserved. The distance you can get between you and your remote flash is determined by the length of cables available. A standard off camera cord is usually about 1m. I have seen videos on YouTube where people buy several cables and hack them together. It can be no surprise that the big manufacturers might possibly limit cable length because they most likely want you to go for a more expensive wireless system.

Optical triggers

These are very cheap to buy, simple to operate and readily available. In fact eBay is overflowing with cheap non name-brand camera accessories such as this. Simply put, it is a wireless system that uses optical triggering i.e. a trigger that attaches to your flash unit and will activate it remotely when it senses another flash (usually the one connected to your camera) firing. This does, of course require a second unit on your camera (or maybe attached to a sync cord) to 'pop' and fire the optical unit attached to your remote flash. When outdoors, the optical trigger may become erratic or, at worst, even useless depending on the power of your trigger flash and the prevailing lighting conditions.

Remote infra-red

A wireless system that makes use of infra-red signals from a sender unit to trigger a flash with a built-in IR receiver. IR is good for indoor use, but does need line-of-sight for the sender and all receiving flash units. IR setups are also infamous for erratic behaviour in bright, warm, sunlit conditions outdoors. The big name brands have their own native IR-based wireless systems but it does mean you are tied in to a specific manufacturer to match your camera system meaning that this type of setup can be quite expensive, particularly if you have to buy a sender unit to control the flashes. You may be lucky, however, as the newer batch of cameras on the market have wireless control built-in. Multiple flashes can readily be triggered with this system.

Wireless transceiver systems

A wireless system that uses 2.4GHz radio frequency from a transmitter to any number of receivers attached to flashes to trigger them. The latest crop of wireless systems are based on what are called transceiver units. This means each trigger can be set to either send or receive a flash fire signal just by setting an appropriate option in a menu or by a flick of a switch on the unit. Once again, eBay has you covered for any number of cheap alternatives like Cactus V2's. You can pick up a Yongnuo RF 603 twin pack for about £30. If you are feeling a little more flush, then £300 will get you a pair of Pocket Wizard Plus III transceivers. I have to put my hand up and admit to getting a native brand wireless system for my Canon setup. It is an ST-E3 wireless transmitter and multiple Speedlite 600EX RT's.

All these systems, cheap or eye-wateringly expensive all benefit from not needing line-of-sight. You can have a flash in the next room and it will still get the signal to fire ok. They also have a good range and work equally well indoors or out. Bear in mind though that the cheaper units are cheap for a reason. Any flash connected to them will have to be controlled manually and individually. TTL metering is not available in cheaper units as well as High Speed Sync. Greater control of your flashes, such as eTTL metering and even High Speed Sync (even something called HyperSync in top of the range models), along with advanced control of multiple groups of flashes, comes at a price.

Although there are a bewildering variety of options out there, the truth of the matter is, you do have plenty of choice and within a wide price range. You just need to assess how you want your equipment choices to work in your standard shooting environment. If you shoot lots of close-up portrait or macro work, then you don't necessarily need a high-cost wireless system that supports multiple flashes that can be operated from a large distance.

A wired, sync-cord approach, is a great way to start out. Besides, it is a useful accessory to have in your kit bag anyway. As with everything photographic, you always have the option to upgrade to other systems later if needs be. With the cord approach in particular, if you find yourself running out of hands to hold and operate flash and camera, consider a cheap light stand to perch your flash on while you are concentrating on shooting. ■

Yongnuo transceivers may not be the most feature-rich wireless system you'll ever come across, but they are cheap and an excellent choice for a first foray into creating a wireless light setup.

Pocket Wizards are a very popular choice for pro photographers. There are a number of systems to choose from and can run to very high prices, but you do get what you pay for.

The Canon 600EX-RT, a powerful flash that can be controlled by the ST-E3-RT. A wireless controller that can work with multiple groups of flashes up to 16 units at once.

SARAH-JANE GETS HER CLOSE-UP

Here is a typical use of off-camera flash. We were shooting at sunset, with the light behind us and off to the right. After getting the basic ambient light exposure correct, we dialled in a two flash setup to light our model and balance her against the scene.

No flash

With no flash lighting the scene, the camera settings were - aperture f/5, shutter speed 1/160, ISO 100.

In the first shot, we needed to dial in the camera settings without the flash. It was a case of getting a decent exposure of the background as the sun was setting behind the hills in the distance off to the right of the shot.

The end result has the sky and the sea correctly exposed but our model is not. Because Sarah-Jane is effectively backlit at this point, she is quite underexposed.

The shots of Sarah-Jane were taken using two flashes controlled by a wireless trigger. It is a great way of being able to keep mobile with your lighting rig, so you can move around easily if needed.

With a two flash setup

Using a two flash setup, our settings were - aperture f/5, shutter speed 1/160, ISO 100. Flash settings - x2 flashes at 1/2 power each.

Having got the camera settings set up correctly to record the background at the correct exposure, the next step was to light our subject. We used two flashes and a shoot-through brolly. The brolly is great for diffusing the light from the flashes. There wasn't necessarily any need for the use of two flashes. We only used two in this case so one flash needn't be overworked all the time by being continuously fired at full power. After a little experimentation we arrived at our final set up with the flashes each at half power, about 5 feet from the subject. Now our shots look much more balanced and have more 'pop'. Our model stands out from the background now. ■

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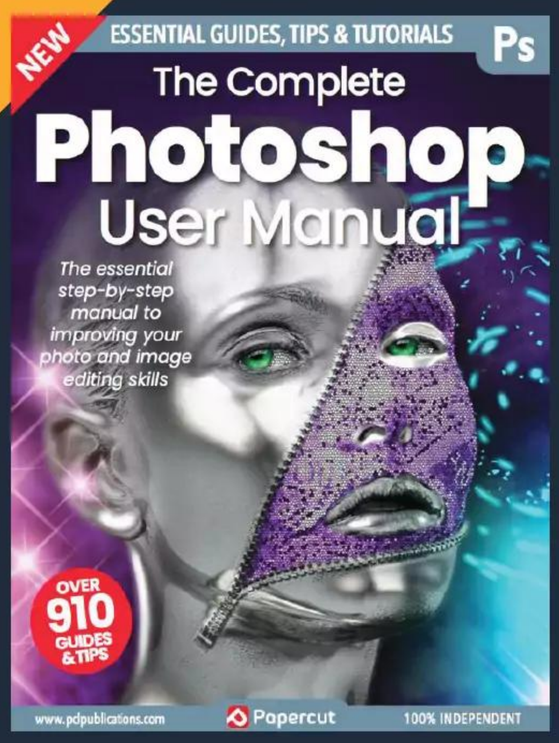

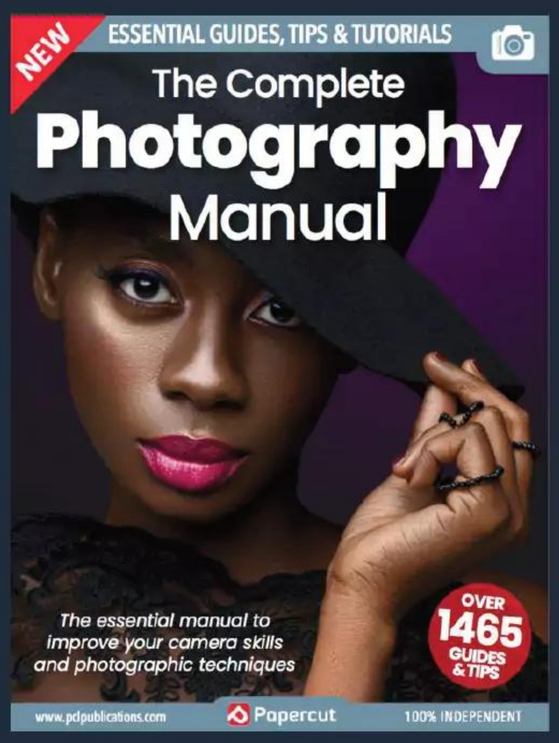

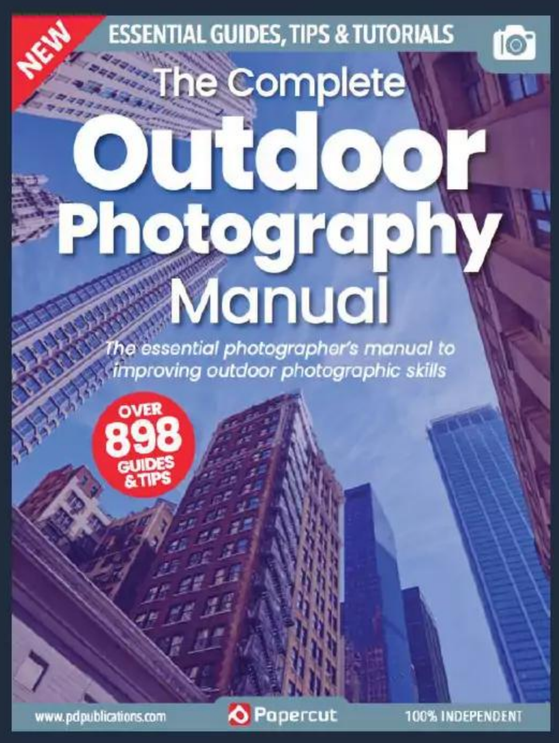

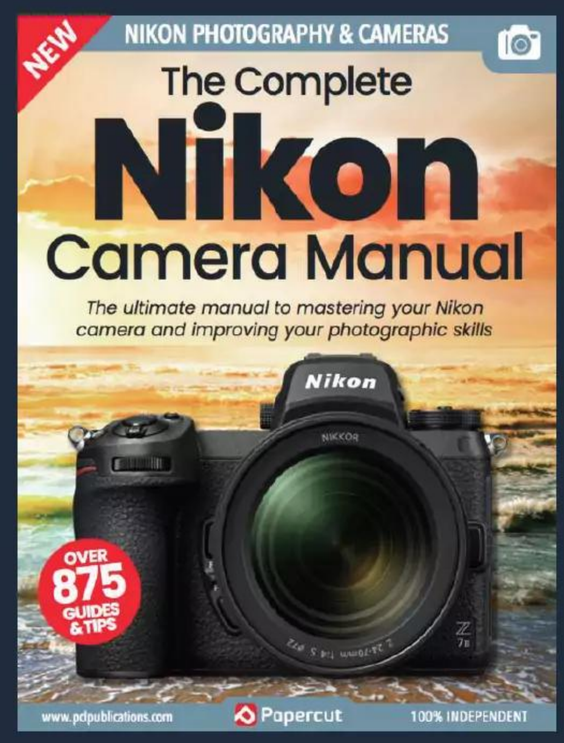

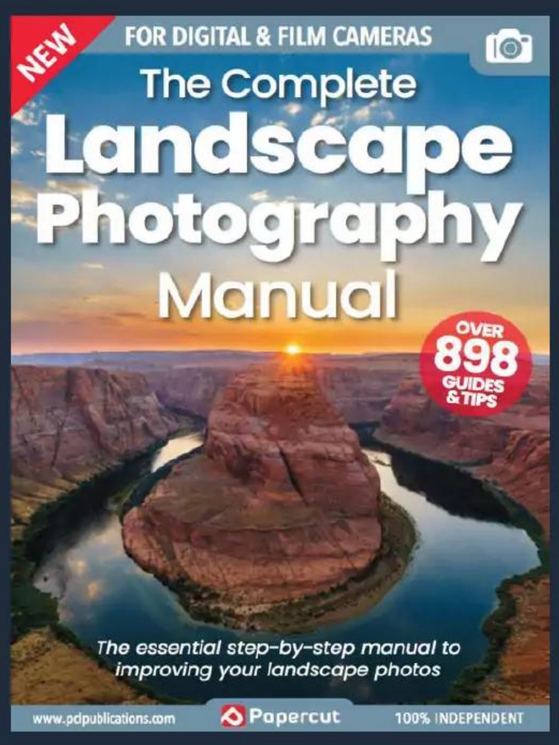

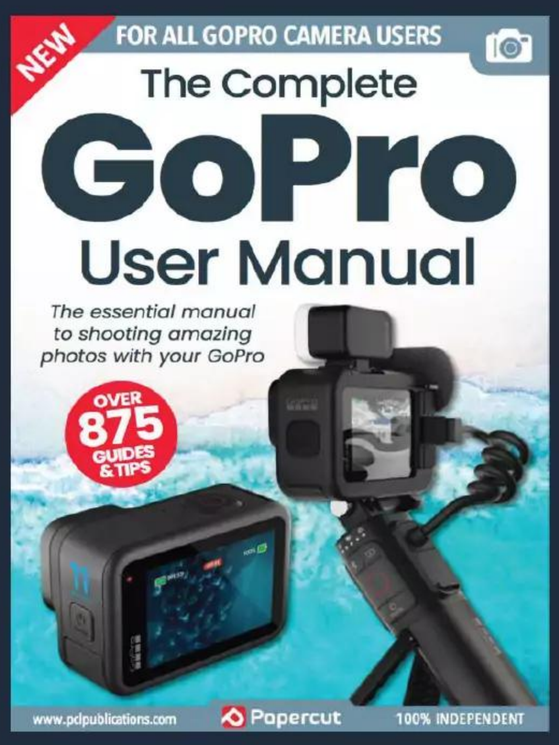

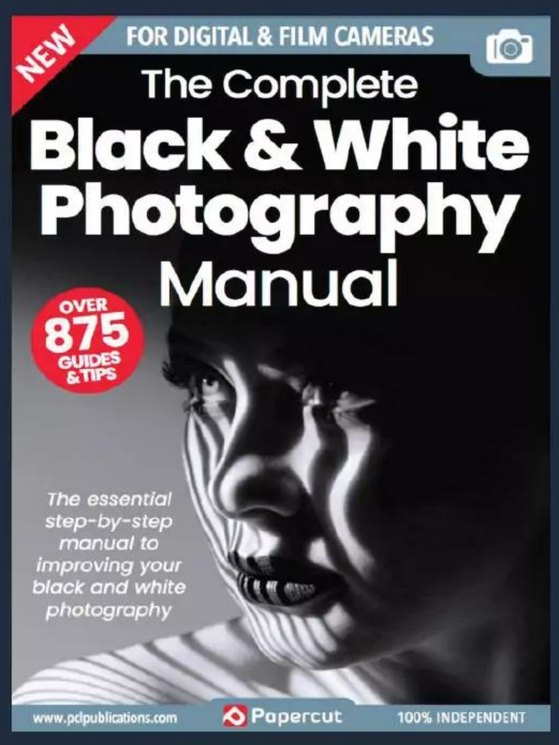

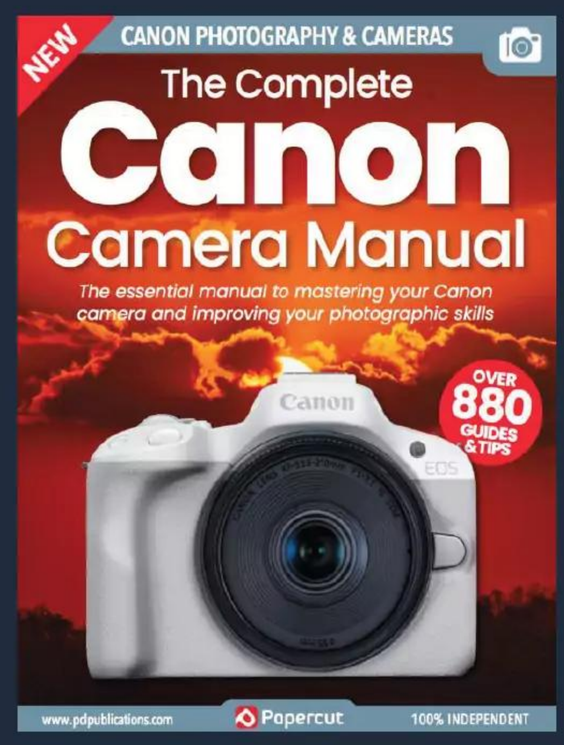

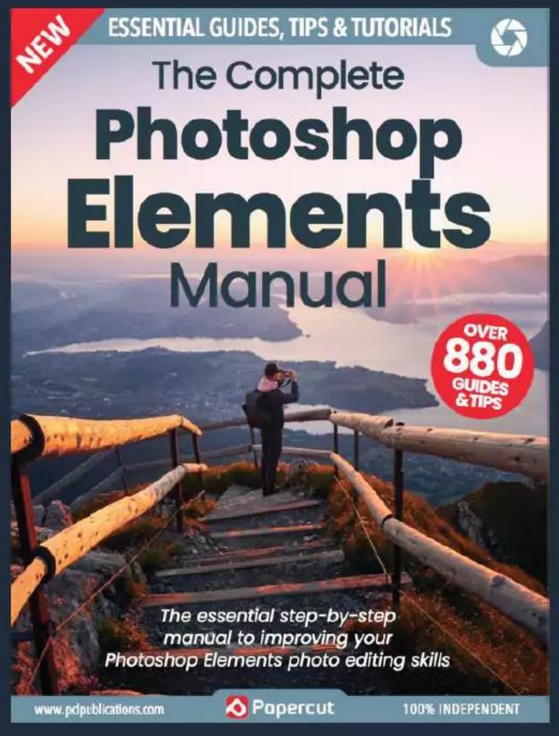

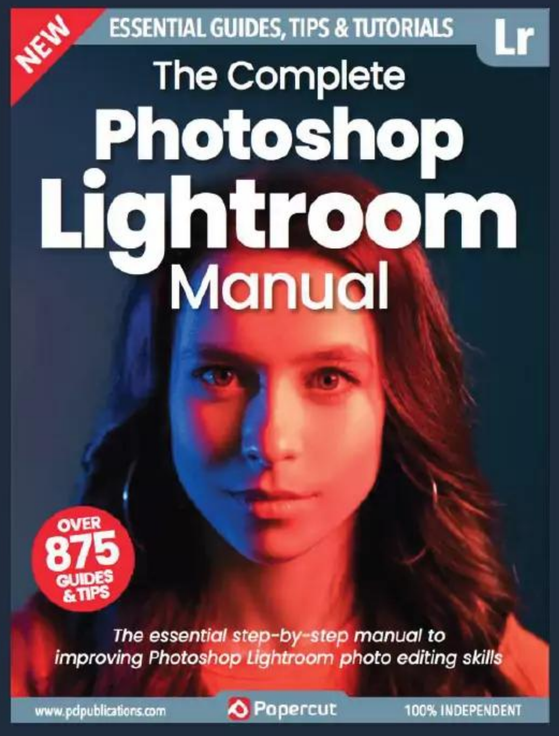

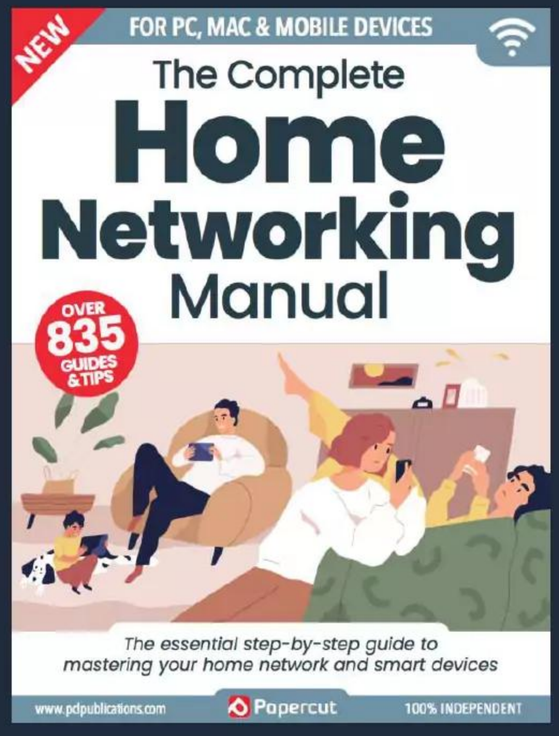

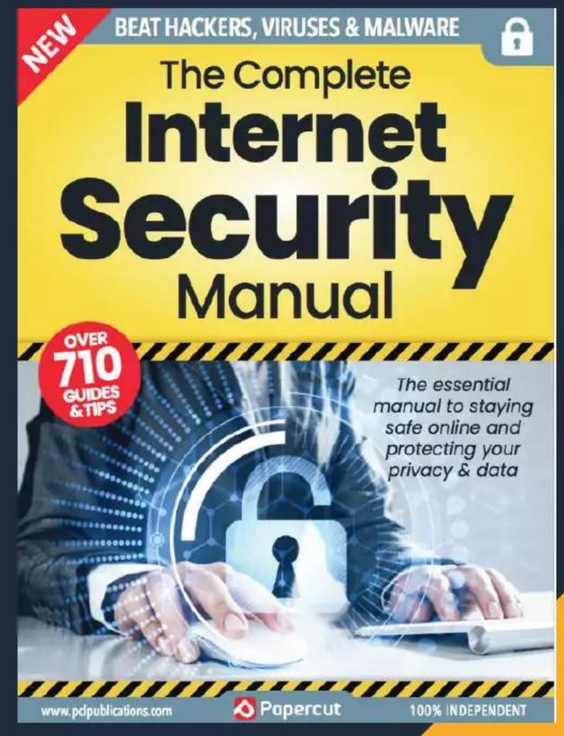

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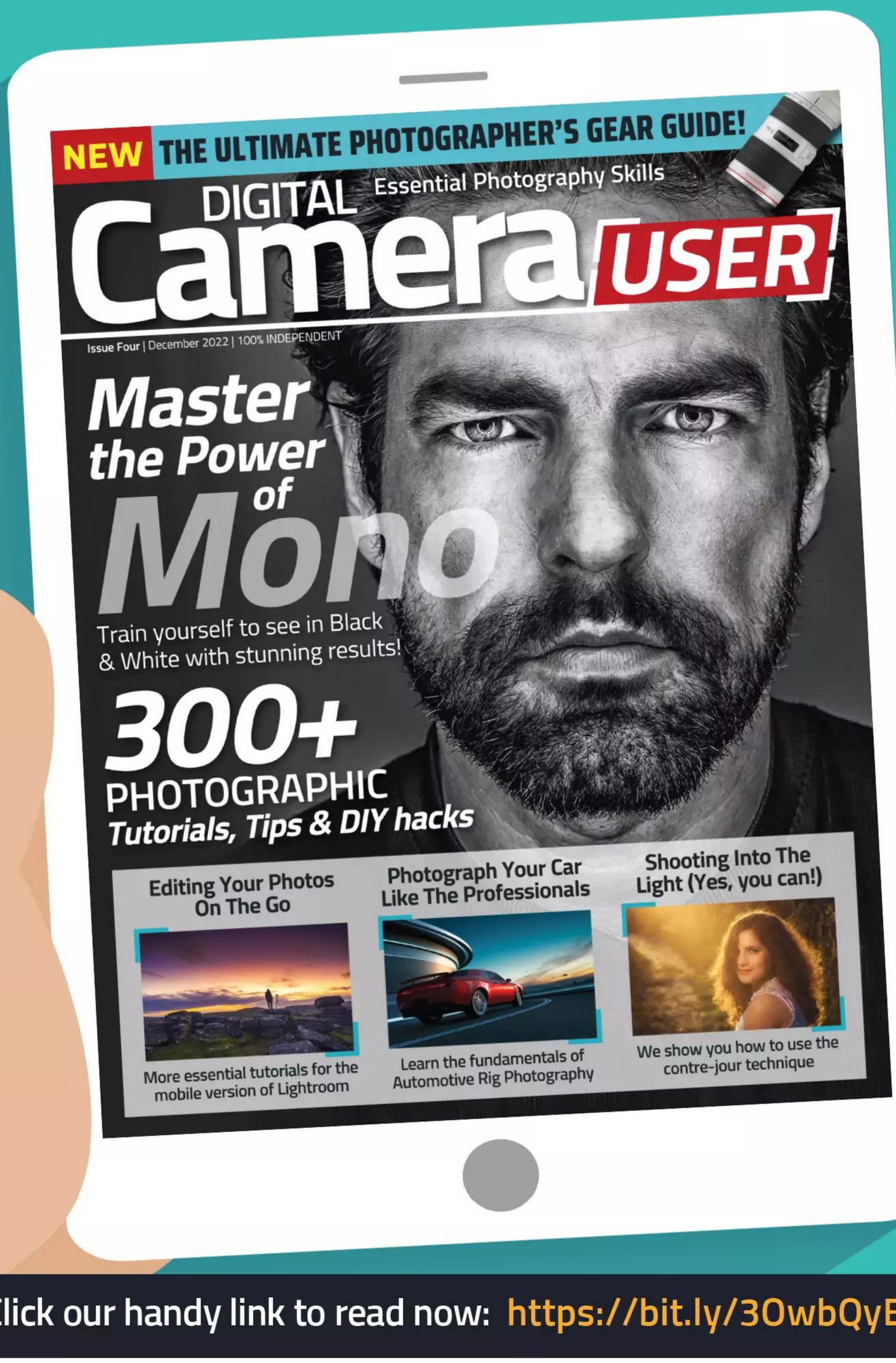
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